ELECTRICAL REVIEW

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ELECTRICAL REVIEW 17th OCTOBER, 1952

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872 • VOL. CLI • NO. 3908

Education and Export

ALTHOUGH the I.E.E. presidential address of Colonel B. H. Leeson had two main themes—the training of engineers and the relation of the electrical industry to current affairs (in particular, its bearing on overseas trade)—these aspects are so closely bound up together as to give them an essential unity. Great Britain's reputation throughout the world as a producer of electrical goods of high technical quality, and hence the maintenance of its position in the forefront of the nations, depends largely upon its ability to train many more technologists than at present. These men have to be qualified to give a useful shape in the shortest possible time to the amount of scientific knowledge that becomes increasingly available. The ability of these professional electrical engineers to make the grade depends upon an education that is sufficiently broadly based to provide a mental background that will enable them not only to deal efficiently with matters of the moment but also to envisage and anticipate in action what the future will call for, abroad as well as at home. Complementary to this requirement is a framework in which scope is given to a diversity of talents. There is ample historical evidence that this framework exists in the voluntary association of manufacturers which, while allowing healthy competition among themselves, has enormously strengthened them in relation to foreign concerns.

It is typical of the British character to do best when it keeps practical ends in view, and the President, in outlining a scheme of education intended to form an integral part of this country's system of education, urges that it should be based on industry. This conception avoids the risk incurred in college-based training, that the acquisition of knowledge for its own sake (the prerogative of the pure research scientist) may come to be regarded as an end in itself rather than as a means to meet a public demand. Present financial stringency tends to favour short-term as opposed to long-term policies. In his insistence that the annual increment of

generating plant, primarily a question of capital investment, should be not less than 2,000 MW (as against a restriction to 1,550 MW imposed by the Government), Col. Leeson implies that with regard to electrical productivity there is, in economic reality, not the difference between the two policies that is found in other matters. Some margin is necessary to permit of testing plant under working conditions. Moreover, Great Britain exports not only electrical apparatus but also designs and brains as well in order to put it into effective operation.

INDUSTRIAL ELECTRIFICATION

In the reports of all the teams which have visited the United States under the auspices of the Anglo-American Council on Productivity emphasis has been laid upon the disparity between the amount of electro-mechanical power available to the American worker and the position in this country. The point was mentioned again in Col. Leeson's I.E.E. presidential address. It is evident that there is wide scope for improvement and as this is an important branch of electrical development it is fit and proper that E.D.A. has taken the matter in hand and has promoted an Industrial Productivity Conference, to be held on 28th and 29th October, particulars of which are given elsewhere in this issue.

MATERIAL SUPPLIES

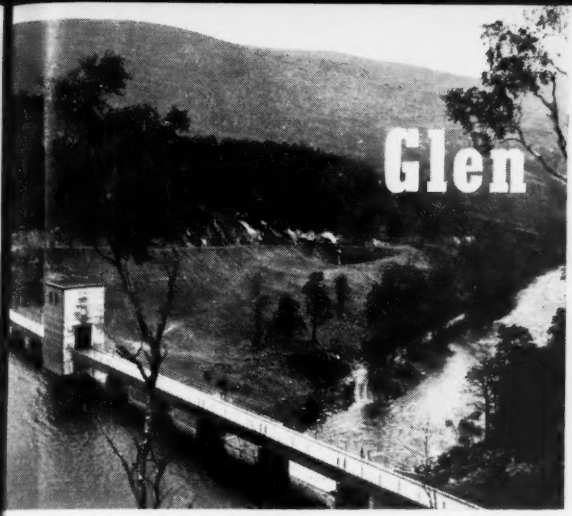
A slackening of demand in many sections of industry in the first half of this year is the unfortunate reason for some improvement in the materials situation. But figures given in the *Board of Trade Journal* reveal a patchy situation. The consumption of lead in the first six months of 1952 fell by 36 per cent as compared with January–June, 1951, and stocks at 30th June were 64 per cent above those of a year earlier. Zinc consumption declined by 4 per cent but stocks were up by 133 per cent. Both consumption and stocks of rubber were lower (6 and 8 per cent respectively). On the other hand copper consumption was 16 per cent higher and stocks 6 per cent lower. It is considered that, apart from copper, aluminium and nickel, production is unlikely to be affected by shortages of raw materials during the current half-year.

REASON PREVAILS

Last week the engineering trade unions agreed to postpone indefinitely the ban on overtime and piecework which they had announced would begin on 20th October. Their decision followed an undertaking by the employers' representatives to recommend their associations to open negotiations for a pay increase. The threatened ban would have caused serious dislocation in essential work at a time when our economy cannot stand such shocks. We are glad that common sense is being exercised at last; neither side was altogether reasonable in the earlier stages of this dispute.

ELECTRICAL BENEVOLENCE

Once again the Year Book (for 1952) of the Electrical Industries Benevolent Association contains a few examples of the practical way in which the Association helps electrical people who have met with misfortune in various shapes. It is not only in the financial direction that assistance is rendered: much is done by approaches to other bodies (including Government Departments) within whose power lie means of amelioration. There was a fall in the Association's revenue last year of £13,199 but this appears to have been due entirely to an absence of legacies—which must always be an uncertain factor. Subscriptions and donations increased and there was a substantially greater contribution from social functions. At the same time the needs also increased and the balance remaining was very small.



Glen Affric

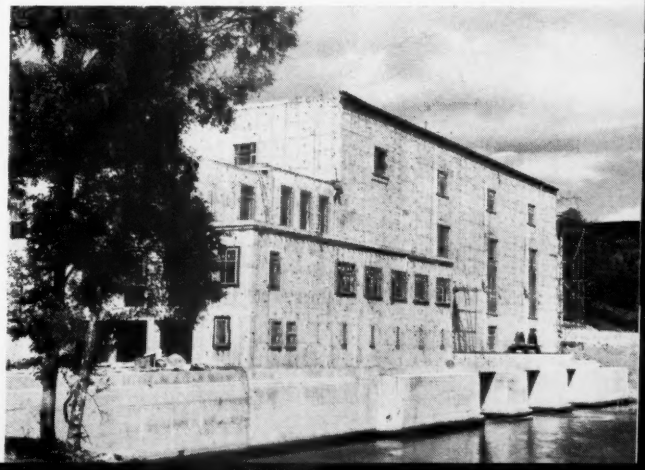
Large Scottish Hydro-Electric Scheme Inaugurated

ON Monday last H.R.H. the Duke of Edinburgh officially inaugurated the Mullardoch - Fasnakyle - Affric scheme of the North of Scotland Hydro-Electric Board by putting into operation one of the three 22,000 kW turbo-alternators in the Fasnakyle power station. This Glen Affric scheme, as it is now generally styled, utilizes the waters in both Glen Affric and Glen Cannich, and with its plant capacity of 68,400 kW it becomes the third largest of the Board's schemes recently commissioned or now under construction. The Loch Sloy development, which was described in the *Electrical Review* of 24th March, 1950, is the largest of these schemes with a total plant capacity of 130,450 kW. The second largest is Errochty with a plant capacity of 75,000 kW.

Although in broad terms the Glen Affric scheme may be described as a single power station project, the fact is that a small unmanned subsidiary underground power station of 2,400 kW plant capacity in the tunnel system between Loch Mullardoch and Loch Benevean supplements the 66,000 kW of main plant at the Fasnakyle power station.

To facilitate description, we propose to deal with the scheme in two sections, the first relating to the catchment area to depict the real source of energy for the scheme, and secondly the power section to show how the stored waters forming the reservoirs are controlled and directed to the power stations.

The present Glen Affric scheme is a modification of two earlier unsuccessful promotions in 1928 and 1941. These earlier plans proposed to raise the level of Loch Benevean to that of Loch Affric, thus creating one much larger loch which would have submerged many of the scenic features of Glen Affric, a famous Scottish beauty spot. The present scheme maintains Loch Affric at its original level, raises the level of Loch Benevean in Glen Affric from about 712ft O.D. to 735ft O.D. which latter level is maintained as nearly as possible



Above: **Benevean dam from intake side**

Right: **Fasnakyle power station is situated on the north bank of the river**

constant, while Loch Mullardoch in the adjacent major valley, Glen Cannich, constitutes the main storage for the whole scheme. Thus the storage lost by the omission of Loch Affric is more than recovered by the inclusion of the larger Loch Mullardoch.

The damming of the Lochs Mullardoch and Benevean, their interconnection by tunnelling, and the tunnelling from Loch Benevean to the power station at Fasnakyle all presented exceptional problems in most

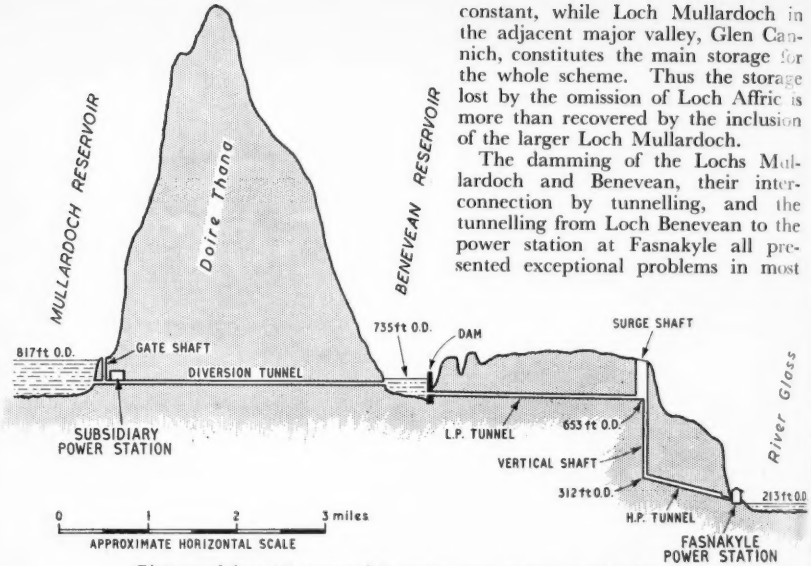
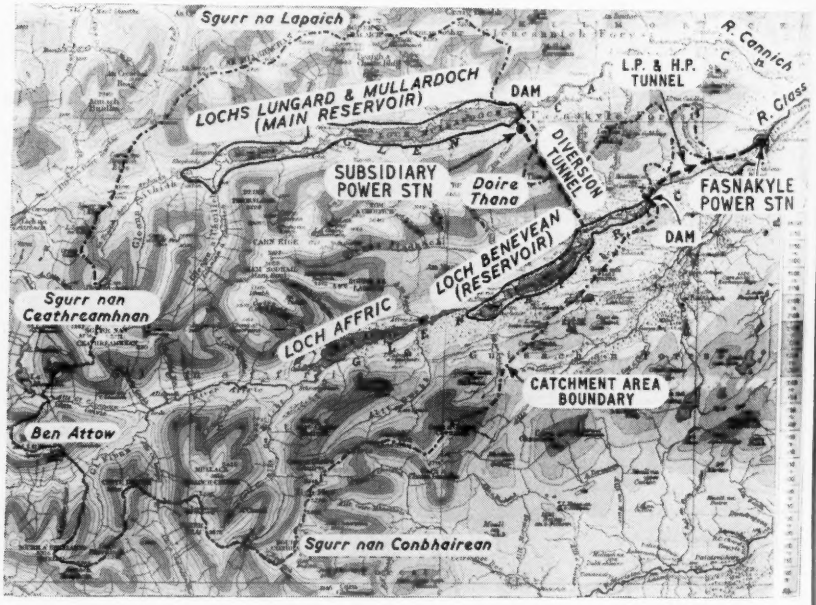


Diagram of the water course of the major power scheme, showing levels

The Glen Affric 124 sq mile catchment area



difficult country, and on the solution of these problems the consulting civil engineers, Sir William Halcrow & Partners, and the main civil engineering contractors, John Cochrane & Sons, Ltd., are, in particular, to be congratulated.

The catchment area of the scheme constitutes 124 sq miles of the counties of Ross and Cromarty and Inverness, in which the annual average rainfall is about 100in which, with the natural storage and heads provided by the area and directed by man, represents an annual output of about 230 million kWh. The area embraces Glen Cannich in the north which originally included both Loch Lungard in the west and Loch Mullardoch in the east and Glen Affric in the south with its original Loch Affric in the west and Loch Benevean in the east, both still retained. The two glens run very roughly parallel east to west.

Notable points on the very irregular boundary line of the catchment area are Ben Attow (3,385ft O.D.) in the south-west; Sgurr Nan Ceathreamhnan (3,736ft O.D.) in the west; Sgurr na Lapaich (3,773ft O.D.) in the north; Mullardoch Dam, Doire Thana (2,884ft O.D.), Carn Loch na Gobhlaig, all in the east; and Aonach Shasuinn (2,901ft O.D.) and Sgurr Nan Conbhairean (3,654ft O.D.) both in the south.

But the Hydro-Electric Board has not been free to direct the waters to its will, and various restrictions have been added to the problems. For instance, a water flow in River Affric has been guaranteed to maintain a minimum of 15 million gallons daily below the junction of the Affric and Tomich Burn outside the area in the east. Again, the Board has undertaken to give from Loch Benevean a "block guarantee" of 2,000 million gall per year to the requirements of the Fisheries and Amenity Committees. Further, half a million gall of water per day released from Loch Mullardoch combines with the water from the tributaries in the 25 sq miles of unaffected catchment area between Loch Mullardoch and Cannich Village together maintain a satisfactory flow of the River Cannich, while the levels of the lochans in the Glen are maintained by specially erected small weirs.

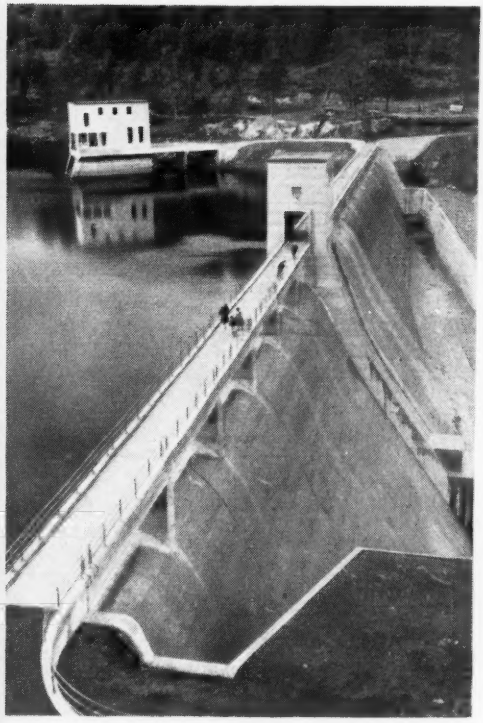
Loch Mullardoch and the dam looking upstream and *(below)* **upstream side of the**

We reproduce a drawing showing in distance and depth the relative components of the main water course or power scheme from the new surface level of Loch Mullardoch of 817ft O.D. to the power station tail race level at Fasnakyle of 213ft O.D., representing a head of 522ft.

Briefly, the power scheme involves the major storage of Lochs Mullardoch and Benevean, representing 31·5 per cent of the total water used; Loch Mullardoch has

Benevean dam during construction—note tunnel end : the dam is built into the gorge of the River Affric

A footbridge is carried across the top of the Benevean dam which forms a spillway 456ft long



been increased by raising its level to 817ft; a tunnel about 3¼ miles long diverts the waters of Loch Mullardoch to Loch Benevean with a change in head of 80ft; a subsidiary power station of 2,400 kW is incorporated in this tunnel system to utilize this difference between the heads. The enlarged Loch Benevean acts as an intermediate storage with its level maintained constant by regulating the flow from Loch Mullardoch; a low pressure and high pressure tunnelling system from the enlarged Loch Benevean to the new Fasnakyle power station is about 3¼ miles from the dam or east end of Loch Benevean; and finally the conversion of the water energy into electrical energy by the three 22,000 kW turbo-alternators in the power station.

By the construction of a dam across Glen Cannich almost at the eastern end of Loch Mullardoch just before this gives Loch Sealbhanach downstream, the waters of Loch Lungard and Loch Mullardoch have collected to form one larger loch with a surface area of 2,330 acres and a total storage of 175,500 acre-feet. This new level represents an increase of 113ft, the maximum height of the dam itself being 125ft. The Mullardoch Dam is the largest of those under construction and recently completed in the area, its length being 2,385ft and its height at the point of the deepest foundation 160ft. It is a gravity type dam of mass concrete construction with a base thickness of about 100ft.

In consequence of the original water

course at the Mullardoch Dam site being split into two ways, leaving a central island in the glen, the dam has been built in two wings, each having an abutment on the island and being inclined to the other wing. Each wing has a 315ft wide spillway, while the south wing is equipped with a scour culvert with a needle valve for emptying the reservoir.

The dual water course at this point facilitated the closing of the dam on its completion. In the first place a cofferdam was constructed across the north water course, so that all but one of the dam blocks in the vicinity could be built up. The exception block was left low so that it could pass the flow on removal of the cofferdam.

Another cofferdam was constructed across the south water course where all the blocks were completed, including the one incorporating the culverts through which the water passed on removal of this cofferdam. The cofferdam across the north water course was then removed and the low block brought up, and finally the dam was sealed by the normal closure of the culverts.

A needle valve with a jet disperser is fitted at the downstream end of one culvert, while the upstream end is closed by a 6ft by 7ft 3in deep free rolling emergency gate. These culvert equipments are of Glenfield & Kennedy production.

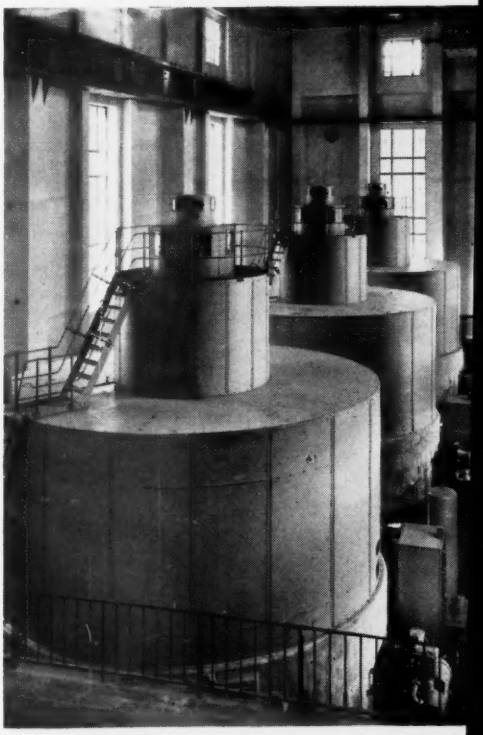
As the result firstly of a capital expenditure cut in 1950 and secondly, a year later, a review of the position making it possible to go ahead with the whole dam to the full height as originally designed, it became necessary to change the design for an increased height of the dam during actual construction. It thus became necessary also to increase the thickness of the dam blocks during construction, but here a problem arose in designing the backing concrete, namely, how to circumvent the effects of contraction of the new concrete in relation to the old.

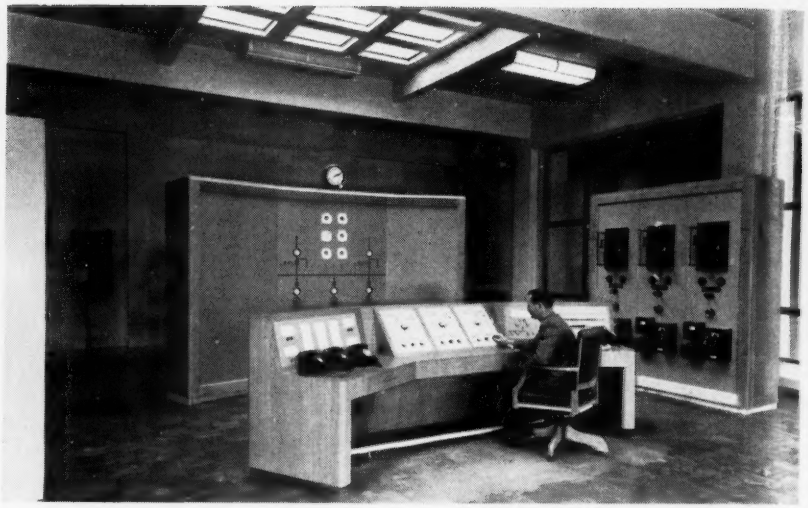
The solution was found by so placing the backing slabs as to leave slots between them and the former face of the dam, which slots could be filled in later when contraction had ceased. To assess the relative movement between the initial and the backing slabs special strain gauge units were designed and made by the Fulmer Research Institute, and the strain gauge measurements were successfully applied by the Institute in collaboration with the consulting civil engineers.

The tunnel for diverting the water of Loch Mullardoch is about 3¼ miles long, of horseshoe section with an equivalent diameter of 15ft 9in. For the major part it is unlined as it was left after the excavation of the 134,000 cu yd of rock. It takes a south easterly direction from an upstream point near the Mullardoch Dam direct to a point on the north shore of Loch Benevean nearly 2 miles upstream from the Benevean Dam. At about its mid-point the tunnel passes through the Doire Thana at a point where the north-eastern slopes of this mountain rise to an altitude of 2,500ft.

At a point about 300ft from the intake portal of this tunnel is a 120ft gate shaft fitted with a 10ft by 11ft 10in free rolling emergency gate. Both gates are of Glenfield & Kennedy manufacture. The main tunnel outfall at Loch Benevean is fitted with a Glenfield fixed roller gate, by means

The turbine hall houses three 22,000 kW vertical turbo-alternators





On an upper floor the control room at Fasnakyle commands a clear view of the turbine hall interior

of which the tunnel can be sealed off so that it can be drained for inspection.

For the drainage work four Beresford 120,000 g.p.h. portable submersible pumps are held ready at the Fasnakyle power station. For driving these pumps the fixed roller gate incorporates a pump shaft which communicates with the tunnel just behind the gate.

Use is made of the 82ft difference in the levels of Loch Mullardoch (817ft) and Loch Benevean (735ft) by the installation in the tunnelling system between the two lochs of a subsidiary generating station. This unmanned underground station is situated near the main tunnel intake. The intake portal for the station itself is at a point about 200ft downstream from the portal of the main tunnel, and the intake is a rectangular section with a semicircular roof 10ft wide by 9ft high. The concrete lined auxiliary power station intake tunnel, which is 82·6 sq ft in cross section, has an invert level of 730ft O.D., and the lowest reservoir level at which the power station will operate is 745ft O.D.

The underground power station chamber measures 22ft long, 26ft wide and 25ft high and there has been sunk to it from the surface a 12ft diameter 86ft deep access shaft in addition to a gate shaft. In the power house chamber will be installed the 2,400 kW turbo-alternator set which will consist of a vertical shaft Francis turbine supplied by Gilbert Gilkes & Gordon, Ltd., which will transmit power to the shaft of the Bruce Peebles horizontal induction alternator through a flexible system.

The auxiliary turbine will discharge through a vertical draught tube into a tunnel which is of the same section as the main tunnel between the two lochs, while it rejoins the main tunnel at a point about 150ft downstream from the access shaft. All the mechanical and electrical controls relating to the auxiliary turbo-alternator are brought up into a winch house near the top of the access shaft.

Raising the level of Loch Benevean to 735ft has increased the intermediate storage here to 22,700 acre-ft which, with the head available, represents an output equivalent of 8 million kWh. The outfall of the tunnel from Loch Mullardoch is at a point about 2·5 miles from the Benevean Dam on the north shore of Loch Benevean. The dam, which is 582ft long and of 125ft maximum height, is built into the gorge of the River Affric about 2 miles below the natural outlet of Loch Benevean. An attractive feature of the new Loch Benevean is a road on the shore which replaces the new submerged riverside track. The new road sweeps in leisurely curves high above the

Loch and the wooded islands which have been created by the raised water level.

A spillway extends over the entire width of the dam and a series of steps control the water flow to the stilling pool which has two longitudinal weirs and a transverse weir. A scour culvert is incorporated in the dam opposite the stilling pool and is equipped with a needle valve which has a jet-disperser and an electrically operated free rolling emergency gate of 6ft span and 7ft depth.

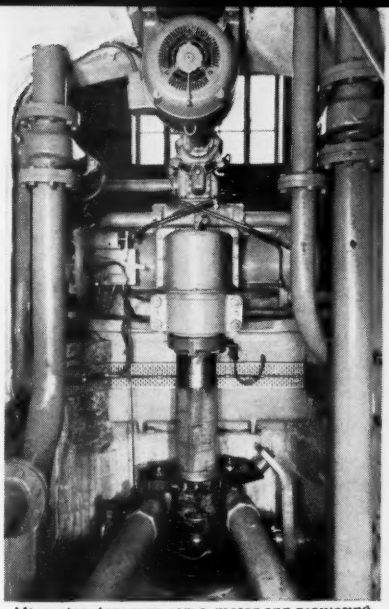
The intake tower of the Loch Benevean-Fasnakyle power station tunnel is built out into the loch, and below the gate house are protective screens, an emergency gate and a control gate for governing the entry of the waters into the tunnel. The tunnel is 3·25 miles long. It is constructed in three sections, the first of which from the loch end is a low pressure section which is 4,113yd long of horseshoe shape and of 14·5ft equivalent diameter. The next length downstream for another 1,408yd is a high pressure circular tunnel 14·5ft in diameter. The l.p. and h.p. tunnels are connected by a vertical shaft which is 341ft deep and 14·5ft in diameter.

This vertical tunnel opens out at the top to a surge shaft 45ft in diameter and 120ft high, the purpose of which is to level out the water pressure fluctuations consequent on sudden stoppages and alterations of water flow between the dam and the turbines.

Finally, at the end of the high pressure tunnel, there is a trifurcation into three steel lined tunnels each 8ft 4in in diameter, which run throughout the remaining 800ft of the overall tunnel length. Each branch of the trifurcated tunnel serves directly one of the turbines in the power house.

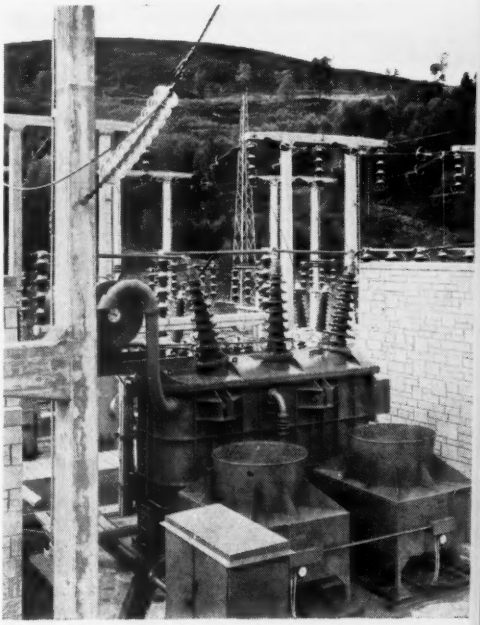
The absence of the normal exposed pipe line consequent on the trifurcated tunnel at the power station end is an unusual feature in this country, and actually, of course, the pressure tunnel replaces the normal pipe line. In construction the steel pipes were first placed in position in the last tunnel section and then concreted into the tunnel.

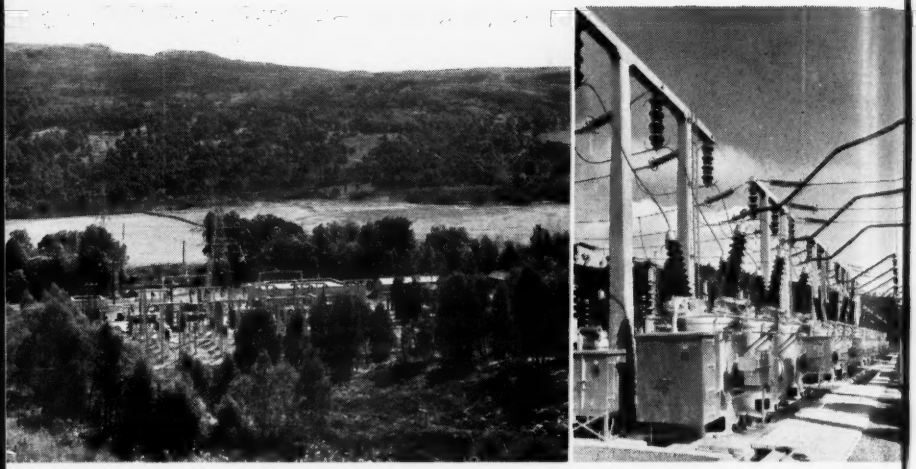
The water flow through the tunnel as a whole is supplemented by waters from three natural streams. Two of these streams are diverted into the low pressure tunnel section through intakes specially designed to prevent air being drawn into the tunnel. The third stream has been diverted directly into the surge shaft. The water supplied



Alternator governor servo-motor and regulating gear for one of the main turbo-alternator sets

The 11 kV alternators at Fasnakyle power station are electrically tied to 23,158 kVA 11/132 kV transformers in the nearby switching station





The Fasnakyle switching station is a short way down the Cannich Road from the power station. The layout is a single busbar scheme with five oil circuit breakers

to each turbine is controlled by a newly developed (English Electric) straight flow turbine inlet valve fitted in the corresponding trifurcated branch of the pressure tunnel. These valves are operated by water from the pressure tunnel, and each is driven by a servo-motor.

The essential design feature of these straight flow valves is the hemispherical door; half the hemisphere is solid and acts as the closing member while the other half is bored out to the diameter of the pipe and forms the follower ring. It is believed that this is the first occasion on which water valves of this type have been put into commercial service in Great Britain.

The Fasnakyle power station, which is situated on the north bank of the River Glass, 54ft above the road level, is the first important part of the scheme which is viewed by visitors. The building is a steel framed reinforced concrete structure faced with golden and yellow sandstone from the Greenbrae quarry, Burghead, thus affording an application of Scottish architectural detail to a modern structure, with resulting harmony with the surroundings.

The turbine hall is 232ft long and 68ft wide, and its imposing height of 65ft enables the 120 ton Arrol crane, which spans the hall inside, to lift any of the major generating sets clear of the foundations.

The control room on an upper floor of the power station commands a clear view of the turbine hall interior and in this control room diagrams show the operating conditions of the main hydraulic and electrical systems and all the generating machinery. Miniature direct control equipment is of Standard Telephones production, while Metrovick automatic voltage regulators are installed.

The turbine house operating floor level is 225ft O.D., i.e., 7ft above the axis of the spiral casings of the turbines. The alternators are set on reinforced concrete plinths which have a top level of 232ft. The 22,000 kW turbo-alternator sets have vertical shaft Francis turbines working under a gross head of 522ft each developing 33,000 h.p. at 375 r.p.m.

The guide bearings for each turbine shaft are carried on the top cover of the turbine, and they are lubricated by a gear driven oil pump. There is, however, an automatically operated d.c. motor driven stand-by pump which is available for starting up and shutting down duties. Transverse fitted keys are used in the power transmission couplings between the turbine and alternator shafts. Main and pilot exciters surmount each alternator with extended shaft direct driving, while a governor alternator on the extreme end of the shaft is a permanent magnet equipment with windings on the rotor poles or

initial magnetizing and remagnetizing. The oil system of each governor equipment is maintained by its own a.c. motor driven pump, but a stand-by Pelton wheel pump starts up automatically on failure of the oil pressure.

The alternators are cooled on the closed air circuit system which is so arranged that about 25 per cent of the circulating air can be extracted for station heating, the hot air entering the turbine room through gratings in the floor. Each 11 kV alternator is directly connected to a 23,158 kVA 11/132 kV on-load tap-changing main transformer in an outdoor switching station situated about 300yd down the Cannich road from the power station. But to revert to the power station, the auxiliaries of each turbo-alternator set are supplied on the unit principle by a 250 kVA 11,000/415 V transformer which is tied electrically to the alternator terminals. Any of the three unit transformers and a fourth stand-by equipment can serve a common services distribution switchboard through hand operated isolators.

The main generator transformers in the switching station are forced oil cooled with forced air circulation from the oil cooling. The station switching is effected at 132 kV at the outdoor switching station which has a single busbar layout and five pneumatically operated 1,500 MVA rupturing capacity oil circuit breakers. Three of these circuit breakers control the output from the power station alternators, while the other two control the loads of feeders to the substation at Beauly.

A 132 kV transmission line from Fasnakyle to Fort Augustus is at present used to provide a 33 kV supply for the construction work of the Garry and Moriston hydro-electric schemes. An 11 kV Cannich-Fasnakyle-Benevean line will be ultimately operated at 33 kV when a 33 kV outdoor substation has been erected at Fasnakyle, with a loop in and out of the Fasnakyle-Mullardoch line.

For auxiliary supplies in the Fasnakyle switching stations there are four 150 kVA 11,000/415 V transformers. The complete turbo-alternators, the main and auxiliary transformers and the 132 kV switchgear were supplied by the English Electric Co., Ltd. Batteries for switchgear tripping, etc., in both the power station and the switching station are Pritchett & Gold equipments.

The consulting electrical engineers for the scheme are Messrs. Kennedy & Donkin, and the architects are Messrs. James Shearer & Annand.

Future of the Highlands

THE continuing progress of the North of Scotland Hydro-Electric Board was outlined by Mr. Thomas Johnston, the chairman, in a progress report given at Glasgow under the heading "Hydro Power and the Future of the Highlands." Stressing the problems of depopulation, limited revenues and limited industry in the Highlands, he claimed that three major assets demanded development—water power, afforestation and tourism. The North of Scotland scheme was already developed to the point where it provided 18 per cent of all electricity generated in Scotland and by 1960, taking into account schemes now in progress and developing, hydro-electricity would account for 64 per cent. The Board's aim was to reduce diesel generation as speedily as possible.

Dealing with wind power generation, he said that Costa Head experiments had proved very successful in providing data. Wind power plant was being redesigned to meet the conditions experienced.

Gas turbine engineers had now assured the Board of successful generation from peat fuel, provided it could be dewatered to 50 per cent content. He promised full support by the Board in efforts to dewater peat economically.

Turning to specific aspects of progress, he cited farms and crofts linked to the mains. In 1947 the figures were one farm in 14 and one croft in 100; to-day they were one farm in six and one croft in six; by 1960 they hoped for an average of one in three. There were still 100,000 potential consumers in the area, but installation became more difficult and costly as distances increased.

The Board had promoted research into electrical hay drying and had reached the point of commercial success. When final data were prepared it was believed that a major advance in farming technique would have been developed, with vitally important repercussions on Scottish farm economics.

The Board was encouraging the fishing industry everywhere in Scotland and had even developed a small but successful trade in eels from its own lochs. It had attempted to encourage electric traction in the Highlands, had fostered the stone trade by opening quarries and was directly assisting in forestry and tourist work.

Electricity and Current Affairs

Col. B. H. Leeson is director of the B.E.A.M.A.

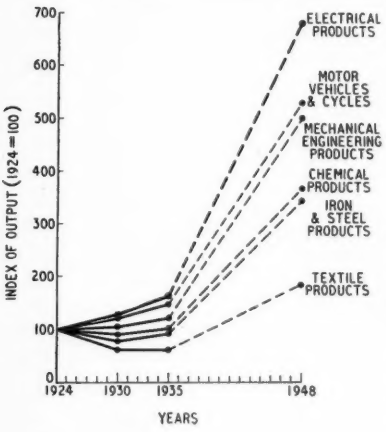
President's Address to the I.E.E.

COLONEL B. H. LEESON chose as the title of his address as President of the Institution of Electrical Engineers (delivered on Thursday last week) "Electricity and Current Affairs." His main theme was the degree to which the national economy was now dependent upon electricity and electrical engineers.

The first part of the address reviewed the activities of the Institution, which, Col. Leeson said, continued to expand and had an immense range. The specialized Sections—Measurements, Radio, Supply and Utilization—formed a good example of the lines on which progress might be made in specialized fields concurrently with general advancement.

Intelligence and foresight were vital to the progress of the profession and to meet the need the Institution had set high standards for membership. At the middle of this year the total membership of all classes was over 37,700, covering not only all divisions of the electrical industry but also all phases of Government and industrial service. A diagram produced with the address showed the following division of membership (31,000, excluding students):—Manufacture, 29·8 per cent; Government services, consulting engineers and others, 22·6 per cent; electricity supply, 20·6 per cent; communications, 10·0 per cent; research, education and training, 9·9 per cent; and installation and maintenance, 7·1 per cent. He showed how employment in the electrical industry had grown since 1925, and compared that growth with the expansion of Institution membership. He mentioned that 18 per cent of the membership were serving overseas; in this connection the predominance of India, Pakistan and Ceylon was diagrammatically illustrated.

Fig. 1.—Expansion of output of six principal United Kingdom manufacturing industries



Next Col. Leeson, after referring to the Institution's formation of the Electrical Research Association, its co-operation with other international scientific bodies and its creation of a Chair of Electrical Engineering in Cambridge University, dealt with the subject of the education of the technologist and technician as it related to membership of the Institution. He set out the needs of the two classes.

Although the pre-war "output" of technologists had been doubled there was an urgent need for increasing the rate. The contributions needed from technical colleges in higher technological education could best be met by concentrating it in a few of the larger colleges, with first-class facilities, on a regional basis. Other designated colleges would be added as the necessary facilities permitted. Each college would have a self-governing representative administration (including industrial representation) and would function as an autonomous unit in close touch with neighbouring colleges and industry. Courses in

the various technologies (which might be chiefly "sandwich" courses) would be industry based and there would be facilities for post-graduate work.

The first essential would be to set up a small body (including a few men of high academic and professional status), under the ægis of the Government, with the necessary finance and authority to select and guide the chosen colleges, in consultation with the professional and scientific bodies and industry. Every section of the industry would have the rewarding duty of providing additional and improved training.

Although the Council of the Institution was no less interested and active in promoting better education and training for technicians this work must be done by other appropriate bodies. A special committee of the Institution was studying this important matter.

Turning to industry itself, the President showed how the value of electrical manufacturing output had risen from £14 million in 1907 to an estimated figure of £700 million last year. The way in which the industry had outstripped in growth other leading industries was shown by curves (Fig. 1). Nearly 600,000 people were now employed in the various branches of the manufacturing industry; added to this figure were 186,600 in the electricity supply industry and electrical contracting. The electrical manufacturing industry was also the third largest exporting industry and one of the world's two largest exporters of electrical goods.

Col. Leeson adverted to the early struggles of the industry when it was unorganized and subject to fierce foreign competition and moreover hampered by repressive electricity supply legislation. When British manufacturers came to a realization of the need for action and co-operative working there was steady evolution of a policy of voluntarily working together which had proved effective and economical.

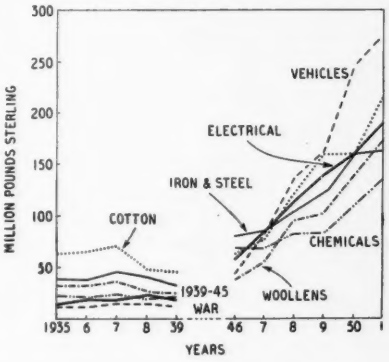
Returning to the subject of exports the President showed that 39 per cent of the country's exports in 1951 were attributed to the engineering industry, comprising mechanical engineering products, motor vehicles, electrical machinery and so on. He said it was axiomatic that successful export trade must be based on a substantial home demand backed by a well-founded reputation for quality, efficiency, reliability and safety. Another set of curves (Fig. 2) was used to illustrate the position of the industry as an exporter in relation to other leading export industries.

The electrical industry as a whole—including radio, domestic and lighter products—contributed last year £189 million towards the payment for essential imports. Generating plant and transmission and distribution equipment was the largest item—34 per cent. Industrial electrical equipment represented 19 per cent, cables and wires 12 per cent, radio and electronic equipment and lamps 13 per cent, telegraph and telephone apparatus 8 per cent and domestic appliance fittings, accessories, etc., 24 per cent. Taking into account the indirect exports of the industry, it was a reasonable estimate that over a third of the industry's output was sent overseas. A predominant share was taken by the Commonwealth.

Repeating the statements that the consumption of electricity was a measure of industrial activity and that the electrical horse-power per worker in America was 2 times that in Great Britain, the President stressed the importance of maintenance of electricity supply. The losses caused by load shedding and power cuts pointed clearly to the need for more generating stations and the replacement of old and inefficient plant. An installation of not less than 2,000 MW a year was imperative. There were no insuperable technical problems; it was primarily a question of capital investment.

The electrical industry had served the country well but it was destined to play a much greater part in the future. Viewing

Fig. 2.—Exports of six United Kingdom industries, 1935-51



the position against the general background, Col. Leeson said that the 1952 Economic Survey made it abundantly clear that our overseas account could not be balanced without a large expansion in the volume of engineering exports. At the same time the engineering industry had to meet the expanding demands of the defence programme. It was impossible for him to envisage the increased production which was called for without increased electricity.

Dealing with shortages, the President showed that insufficient coal was the cause of many other difficulties. There had also been a fall in the amount of human effort and the combined effect was felt in shortages in many directions. If we were to recover there must be more man-hours of work, greater production of basic commodities, more fuel and power for industry and the home, and more capital, i.e., greater savings by Government, industry and individuals. Greater human effort was the essential and given this the pump of extra production would be primed, shortages would disappear and a stable economic system would be created.

The President said that he had not attempted to deal with the future potentialities of scientific discovery and invention. It was unlikely that atomic-energy power stations would be in practical operation for some years to come.

His object had been to stimulate thought and action in matters of vital importance to the well-being and future of the country.

World Power Conference

THE new edition of the list of National Committees and representatives of the World Power Conference is now obtainable for 1s 6d post free from 201, Grand Buildings, Trafalgar Square, London, W.C.2. This publication contains full and up-to-date information about the composition of 37 National Committees and gives the membership of the British National Committee together with the names of the W.P.C. representatives in three countries (Ceylon, New Zealand and Pakistan) which do not yet possess National Committees.

Sir Vincent de Ferranti, chairman of the British National Committee, presided in his capacity of chairman of the International Executive Council at the latter's meeting in Chicago on 4th September. The United Kingdom delegates were Sir John Hacking, Dr. A. Parker and Sir William Halcrow. Mr. C. H. Gray, secretary of the Council, was also present. The meeting was attended by 33 delegates from 17 different countries. There was an especially strong delegation from the United States, led by Mr. Gail A. Hathaway, who has recently been elected chairman of the U.S. National Committee, and the Canadian delegation was led by Major Gen. H. A. Young, chairman of the Canadian National Committee.

The matters discussed included the technical programme of the sectional meeting of the W.P.C. which is to be held at Rio de Janeiro from 25th July to 8th August, 1954. The theme of that conference will be the energy problems of the tropical and sub-tropical countries.

The term of office of Mr. Ernest Mercier (France) having expired, his place has been taken by Mr. Gail A. Hathaway, the other two vice-chairmen being Shri A. N. Kosla (India) and Dr. A. J. Alves de Souza (Brazil).

The representative of the French National Committee announced that his Committee expected next year to issue a formal invitation for the fifth plenary W.P.C. to be held in Paris in 1956. If this invitation is not, for any reason, confirmed, an invitation will be issued by the National Committee for the German Federal Republic.

Preliminary notice was given by Gen. H. A. Young of the intention of the Canadian National Committee to invite the W.P.C. to hold a sectional meeting in Canada in 1958. The International Executive Council will hold its 1953 meeting within the German Federal Republic, the place and date to be announced later.

The annual executive meeting of the International Commission on Large Dams (of the W.P.C.) is to hold its 1955 Congress in Paris, while preliminary notice was given of the intention to invite the sixth Congress to be held in the United States in 1958 in combination with the sectional meeting of the W.P.C. which will take place in Canada about the same time.

VIEWS on the NEWS

By REFLECTOR

AMONG the hobbies indulged in by electrical men photography, in its still or moving forms, is probably the most frequently encountered. It can take special forms and I have heard of one man (Mr. T. L. Franklin of the Banner Electric Co., Ltd.) who acts as local cine-historian in the Hoddesdon district of Hertfordshire. He makes annual news reels recording the doings in the neighbourhood and exhibits them to local audiences in aid of local charities. This year's edition includes a sequence showing the erection of a 132 kV line connecting the new Rye House power station to the grid. Mr. Franklin proposes to place his films in the custody of the Hoddesdon Keeper of Records.

* * *

The term "amateur" is invariably applied in a derogatory sense when it relates to electrical matters. A coroner used it in this way when commenting on the death of a man who received a fatal shock while fixing a television aerial. The word once had a very different meaning from "incompetent dabbler"—it still has in the field of sport—and maybe it is not always fair to use it scornfully in the case of non-professional electricians. The *Model Engineer*, in treating of this subject, says:—"Many amateurs that we know are highly competent and more conscientious than the average professional mechanic." That may well be but it is generally desirable to place electrical work in safe hands.

* * *

Greater optimism regarding atomic power prospects is shown by the Monmouthshire County Council than most authorities on the subject. The *South Wales Argus* reports that the County Council is asking the B.E.A. to defer for seven or eight years its proposal to build a large power station between Rhiwderin and Lower Machen because "in the next six or seven years the whole policy of power generation might be changed by the civilian use of atomic power." In support of this suggestion the county planning officer is reported to have quoted a statement by the chairman of the Atomic Energy Commission but I believe that this was a somewhat qualified forecast. Actually objections to the station are based on other than purely economic grounds.

* * *

The extent to which the largely-unjustified fear of electricity stoppages has penetrated is illustrated by a recent advertisement in the national newspapers by a well-known woollen manufacturing concern. It shows a man clad in vest and shorts reading a news-sheet with the improbable title of "Power Cuts." The text of the advertisement is "Nobody can switch off the warmth in —— underwear." This is no doubt quite legitimate, but it is bad for the electrical industry.

* * *

Recently I referred to a note in the *Sheffield Telegraph* on the exclusion of the Press from local committee meetings of the Yorkshire Electricity Consultative Council. Mention was made of the reported suggestion that committee chairmen should issue statements to the Press before the meetings. I am told that the Council's decision actually was that statements should be issued *after* the meetings, which is certainly more logical. At the same time the Council agreed to continue to admit the Press to all full meetings of the Council. I still feel that it would be better if the local meetings also were thrown open.

* * *

At a recent meeting of the Salop Licensed Victuallers' Association it was decided (says the *Morning Advertiser*) to press the Midlands Electricity Board to revise the method of charging for current consumed on licensed premises. What does the Association suggest—electricity by the pint or nip?

PERSONAL and SOCIAL

News of Men and Women of the Industry

TRIBUTE was paid to **Mr. E. W. Bussey,** C.B.E., on his retirement as labour relations member of the British Electricity Authority, by officers of the training, safety, health and welfare departments and the District Joint Advisory Council secretaries at a conference held in Buxton recently. It took the form of a signed memorial and an electric tea-making equipment, which were presented by Mr. J. W. Thomas, who until recently was a director of training, safety and welfare with the B.E.A.

Mr. J. Christie, who held the position of assistant engineer, Skelmorlie Sub-District of the South West Scotland Electricity Board, retired on 30th September after forty-four years' service in the electricity supply industry. Before vesting date, Mr. Christie was the local engineer for the Skelmorlie Electric Supply Co., Ltd. On his retirement he was presented with an electric clock and table lamp from the staff and employees of the Greenock District of the Board.

Mr. G. W. G. Canter, manager, Marine and Special Contracts Department, Metropolitan-Vickers Electrical Co., Ltd., is now located at the company's London office, 1-3, St. Paul's Churchyard, E.C.4. **Mr. J. Nicholson,** A.M.Inst.N.A., M.I.Mar.E., A.M.I.E.E., A.M.I.Mech.E., has been appointed assistant manager, Marine and Special Contracts Department, and will be located at Trafford Park. Mr. Nicholson received his technical training at the Dundee Technical College and was apprenticed to the Caledon Shipbuilding & Engineering Co. He joined the Metropolitan-Vickers Motor Department in 1928, working successively in the drawing office and on the sales side. In 1936 he moved to the London office where, after a few years as an industrial sales engineer, he joined Mr. Canter on marine and Government liaison work.

Mr. J. Nicholson

The Micanite & Insulators Co., Ltd., has appointed **Mr. A. N. Hawthorn,** A.R.I.C., as chief chemist in succession to the late Mr. E. L. Potter. **Mr. J. K. Clark,** B.Eng., A.M.I.Mech.E., A.M.I.E.E., A.M.I.Ex., becomes export sales engineer, **Mr. G. R. Harris,** M.P.O.A., first assistant to Mr. F. W. Woodward, M.P.O.A., chief purchasing agent, and **Mr. H. D. Hill,** assistant sales engineer, London and South-East England.

Mr. R. B. Richardson, D.P.A., A.M.I.E.E., has been appointed commercial officer of the Fens Sub-Area, Eastern Electricity Board, and will take up his new duties early in November. Mr. Richardson, who is at present commercial officer of the Hull Sub-Area, Yorkshire Electricity Board, received his training with Edmundsons Electricity Corporation, Ltd., at Berwick and Ramsgate. He subsequently held appointments in the North of Scotland and at Maidstone. He joined the staff of the Hull Corporation Electricity Department as installation superintendent and later became consumers' engineer. On vesting day he was appointed sub-area commercial officer. Mr. Richardson was leader of the distribution team drawn from the fourteen Area Boards which toured the United States in the autumn of 1949 under the auspices of the Anglo-American Council on Productivity.

Mr. R. B. Richardson

The Melchett Medal was presented at the annual dinner of the Institute of Fuel on 9th October by the president, Dr. G. E. Foxwell, to **Dr. D. T. A. Townend,** Director General of the British Coal Utilization Research Association, and formerly Livesey Professor in the University of Leeds.

The Leon Gaster Memorial Premium of the Illuminating Engineering Society has this year been awarded to **Mr. J. S. McCulloch** for his paper entitled " The Lighting of Shipyards." Mr. McCulloch is with R. W. Gregory & Partners, consulting engineers, of Newcastle-on-Tyne.

Honorary membership of the I.E.S. has been awarded to **Professor J. T. MacGregor-Morris** in recognition of his many services to

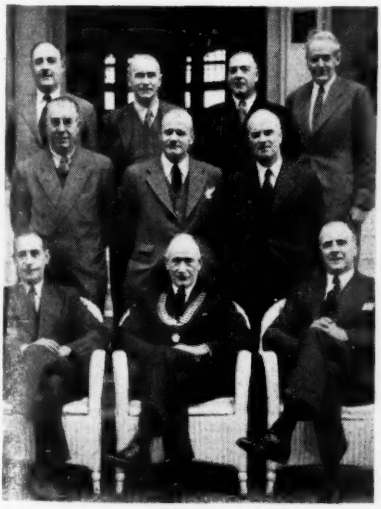
the Society and in acknowledgment of his pioneering work in illuminating engineering and photometry, particularly his research on the carbon arc as a standard of light. Professor MacGregor-Morris is one of the original members of the I.E.S. and was president in 1940.

Mr. Edgar H. Wale, secretary of the Cable Makers' Association, was injured in the railway disaster at Harrow and Wealdstone station last week, sustaining a broken ankle and other foot injuries. He is progressing favourably in Edgware General Hospital.

Mr. S. A. Clarke, who first became associated with Gent & Co., Ltd., in 1910, and has been progress manager for a number of years, has been appointed to the board of directors.

Mr. K. M. Fox, A.M.I.E.E., until recently in charge of the British Thomson-Houston Co.'s district sub-office, Bristol, has been appointed manager of the company's Swansea district office in succession to **Mr. S. J. Clarke,** who will shortly be taking up another appointment in the B.T.H. organization. Mr. Fox completed a student apprenticeship course with the B.T.H. Co. in 1928, and after two years' experience on construction work he was appointed to the staff of the industrial engineering department, Rugby, where he specialized in paper mill drives. In 1936 he joined the industrial sales department at head office, and during the war served in H.M. Forces, holding the rank of lieut. (elec.) R.N.V.R. On demobilization in 1946 he was appointed to the staff of the B.T.H. London district office, taking over the management of Bristol office in 1949. As previously announced, **Mr. K. G. Leach** succeeds Mr. Fox at Bristol.

Members of the Council of the Electrical Wholesalers' Federation at a meeting held recently in North Berwick, showing, left to right, standing, Messrs. J. M. Hollander, J. W. E. Rutherford, W. Crisp and A. B. Wildsmith (Director); middle, H. Riley, C. Hall Marr and R. E. Silvey; and seated, G. W. Cartwright (immediate past president), W. H. Swain (president) and E. A. V. Peckham (vice-president)



Mr. H. A. Springer, A.M.I.E.E., has been appointed contracts manager of Sangamo Weston, Ltd. Mr. Springer served a five-year engineering course at Johnson & Phillips, Ltd., Charlton, leaving there in 1932 to join Sangamo Weston, where he has held various positions in the manufacturing and contracts departments.

Mr. H. A. Springer

Mr. L. W. Robson has been appointed deputy chairman of Associated British Engineering, Ltd. Mr. A. P. Good, who, as we reported in our last issue, has resigned on medical grounds from the managing directorship (while remaining deputy chairman) of the Brush Electrical Engineering Co., Ltd., the parent company of the Brush Aboe Group, is retaining the chairmanship of Associated British Engineering, Ltd.

Mr. M. E. Fishburn has been appointed London manager of the Stanton Ironworks Co., Ltd., in place of **Mr. R. Kimber,** who is retiring after thirty-three years' service with the company.

Mr. C. B. Clapham, B.Sc., A.M.I.Mech.E., A.M.Inst.T., assistant secretary to the Road Passenger Executive, has been transferred to London Transport as an officer of the Executive with the title of assistant to the works manager (buses and coaches) in the Department of the Chief Mechanical Engineer (Road Services).

Mr. F. C. Hubbard has been appointed manager of the Arora Company, Loughborough, in succession to **Mr. W. R. Coleman,** whose resignation we reported in our 3rd October issue.

The Birmingham Branch of the **Electrical Industries Benevolent Association** held its annual carnival dance on 3rd October at the Magnet Club, Witton, Birmingham, 650 people attending, including many leading personalities of the industry.

Mr. W. H. Pilkington was appointed deputy-president of the Federation of British Industries at the meeting of the Grand Council

on 8th October. Mr. Pilkington is chairman of Pilkington Brothers, Ltd., and a director of its subsidiaries at home and overseas.

The annual dinner and dance of the **Henley Group of Companies** was held at the Dorchester, London, W.1, last Saturday, when there was an attendance of over 700. After the dinner, at which Sir Montague Hughman (chairman) presided, the toast of "The Henley Companies" was proposed by Mr. A. T. Winder, manager of the Birtley (Durham) works. In the course of his speech he said that there was something in being with a concern which did not suffer from the modern tendency of large companies to become soulless. Responding to the toast, Sir Montague Hughman thanked the organizing committee which had arranged the dinner. He also expressed his own and the directors' appreciation of the staff and said that he would not be chairman much longer, although he would continue to be a director. Mr. A. V. Burnett proposed the health of the ladies in a much-appreciated speech and Miss Elsie Savage made a very effective reply. Arthur Salisbury's orchestra provided music for dancing and during the dinner, and a cabaret show was given by "The Sensational Singers" and Wally Goodman and his square dancing.

Nearly 300 guests representing the motor, radio and cycle trades and commercial vehicle operators in the West Country attended a dinner and cabaret held jointly by **F. O. Coward, Ltd.,** Stokes Croft, Bristol, and the directors of **Chloride Batteries, Ltd.,** at the Berkeley Restaurant, Bristol, on 6th October. They were welcomed by Mr. F. O. Coward and Major S. D. H. Brown, directors of F. O. Coward, Ltd., and Mr. F. Atkinson, area sales manager, Chloride Batteries.

Sir Archibald Forbes, president of the Federation of British Industries, has accepted an invitation to be the principal speaker at a luncheon in Toronto of the Canadian Chamber of Commerce, on the occasion of its twenty-third annual meeting on 23rd October. He plans to spend about two weeks in Canada, after which he will visit New York and Washington.

Mr. J. A. C. Kendle has been appointed sales manager of the Edison Swan Electric Co.'s Wiring Accessories Department, which has been set up to handle the sales of electrical accessories manufactured by the "Ediswan" subsidiary companies, British Mechanical Productions, Ltd., and the General Accessories Co., Ltd. This appointment means that Mr. Kendle has returned to the service of the A.E.I. group for, during the late 1920's, he was attached to the London office of Metropolitan-Vickers Supplies, Ltd., and represented the company in the Eastern counties. From 1934 until joining the R.A.F. Regiment in 1941, Mr. Kendle represented T.M.C.-Harwell (Sales), Ltd., in London and Southern England. He returned to T.M.C.-Harwell (Sales) in 1946 and in 1948 he was appointed assistant sales manager, the post he relinquished to join "Ediswan." Mr. Kendle's assistant is **Mr. A. F. Jackson,** who has for several years been representative of the General Accessories Co., Ltd., in London and South East England.

Mr. J. A. C. Kendle

On Monday last the **Duke of Edinburgh** opened the new power station of the North of Scotland Hydro-Electric Board at Fasnakyle, Inverness, when he started up one of three 22,000 kW generators (see page 821). The Duke said the scheme would save 150,000 tons of coal a year. From what he had seen there was no justification in the criticism that the Board was wantonly destroying the natural beauty spots of the Highlands, and he congratulated the Board on the success of its efforts to preserve the character of such a lovely part of Scotland.

On behalf of the staff of the whole of the Board's organization, the Duke was presented with a silver cigarette box decorated with a Celtic scroll.

The Duke of Edinburgh switching on one of the turbines at Fasnakyle generating station. On the right is the Rt. Hon. Thomas Johnston, chairman of the North of Scotland Hydro-Electric Board. Mr. S. Oliver, generation engineer, is on the left

The Governors of the B.B.C. have appointed **Sir Ian Jacob**, lately Director of External Broadcasting, to succeed Sir William Haley as Director-General of the B.B.C. Sir Ian will take over from the present acting Director-General, Mr. B. E. Nicolls, on 1st December.

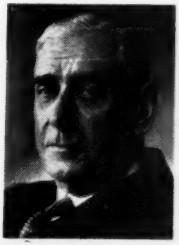
Sir Ian Jacob

Mr. R. S. Crump, M.I.Mech.E., technical director and chief engineer of Henry Meadows, Ltd., is retiring from the latter position, but remains on the board and continues as technical consultant. **Mr. J. E. Robinson**, chief technical supervisor of Petters, Ltd., joins the company as chief engineer, **Mr. G. Wedge**, sales manager, is taking over the position of technical adviser. **Mr. E. B. Christie** is appointed contracts manager and **Mr. A. F. Brown**, who recently joined the company, is sales promotion manager.

OBITUARY

Mr. L. Brooke.—W. T. Henley's Telegraph Works Co., Ltd., announce that Mr. L. Brooke, manager of the company's Leeds Branch, died on 8th October at the age of fifty-nine years. Mr. Brooke joined Henley's as a traveller at Leeds in November, 1926. He was appointed manager of the Sheffield Sub-Branch in September, 1928, and in January, 1937, became manager at Leeds.

Mr. Duncan MacArthur, director and general sales manager of the Metropolitan-Vickers Electrical Co., Ltd., died suddenly at his home in London on 7th October. Mr. MacArthur had spent the whole of his business life with Metropolitan-Vickers, having joined the company (then British Westinghouse) in September, 1906. The early part of his career was spent in Glasgow, and in 1919 he became manager of the district office there. In 1935 he was transferred to London, being appointed manager of the London office. In 1943 Mr. MacArthur was elected a director of the company, and in the following year he became manager, home sales. In 1945 he was appointed general sales manager. He also joined the board of the M-V Export Co. Mr. MacArthur was chairman of Newton Victor, Ltd., and Newton & Co., Ltd., and a director of Metropolitan-Vickers South Africa (Pty.), Ltd., Metropolitan-Vickers-G.R.S., Ltd., and Sunvic Controls, Ltd.



The late Mr. D. MacArthur

Mr. James Nesbit Robertson, M.I.E.E., manager of the Derbyshire and Nottinghamshire Sub-Area of the East Midlands Electricity Board, died suddenly on 11th October at the age of sixty-three. Educated at George Watson's College, Edinburgh, he entered the electricity industry in 1911 as a junior shift engineer with the Glasgow Corporation. After service with the Royal Naval Division and the Royal Engineers during the 1914-18 war, he returned to Glasgow remaining with the Electricity Department until 1923, when he joined British Electric Transformers, Ltd., as sales representative. In 1935 he was appointed commercial engineer with the Leicestershire & Warwickshire Electric Power Co., and in 1938 he became local manager of the Derbyshire & Nottinghamshire Electric Power Co., being appointed manager of the Sub-Area on nationalization.

Miss Natalie Turner, daughter of Mr. C. A. Turner, managing director of "Diamond H" Switches, Ltd., met her death in the railway disaster at Harrow-Wealdstone on Wednesday last week.

WILLS

Mr. H. S. Stokes, a director of James Ward (Worcester), Ltd., electrical contractors, who died on 18th November last, left £15,228 gross (£14,717 net).

Mr. W. G. Newnes, publicity liaison officer of the diesel engine division of the English Electric Co., Ltd., who died on 3rd May last, intestate, left £1,241 gross (£930 net).

Eastern Consultative Council

THE "simple economic truth" that the more consumers reduced their use of electricity the higher the price was likely to be was stated by Ald. W. J. Bennett, chairman, at last Friday's meeting of the Eastern Electricity Consultative Council. Mr. C. T. Melling, the Board's chairman, who gave a short address, also spoke of the Board's preference for covering rising costs by a greater volume of business.

On the subject of tariffs, Ald. Bennett said that there seemed to be a general feeling that small hotels fared rather badly under the new tariffs and this matter would receive attention. There had also been representations from a number of churches.

The Council had received from the Board a schedule of schemes for the six months to the end of March next which showed that every effort was being made to expedite rural development. Details had also been submitted of a new order of priorities which the Board had agreed broadly to follow.

Scottish Building Centre

Electrical Section Reopened

THE re-equipped Electrical Section arranged by the British Electrical Development Association at the Scottish Building Centre, Sauchiehall Street, Glasgow, was opened on 10th October. Its main purpose will be to act as a focal point for distribution of trade literature, to answer professional, trade and public inquiries and to act as an information centre.

Approached through an open entry the first floor showroom uses a multi-coloured tiled wall to present appliances against a varied background to allow assessment of colour values. The deep blue roof ends similarly in a cartwheel rainbow section where tubing provides comparison of colour against colour. Low platforms around the wall carry appliances and demonstrations. Main emphasis is now on cooking equipment and allied housing requirements. Insulated wall water sections, piping and appliances are all shown. A modernistic multi-section literature dispenser is used to carry data on every aspect of electrical promotion.

Mr. J. S. Pickles, chairman of the S.W. Scotland Electricity Board, presided at a luncheon held to mark the opening of the new Electrical Section. Mr. A. Graham Henderson, past president of the R.I.B.A., proposing the toast "Electrical Development," referred to the valuable work done by the Section and the Building Centre. He stressed too the importance of design in the development of electrical premises and equipment and the fact that they had been fortunate in having guidance from E.D.A.

Mr. H. Nimmo, chairman of E.D.A., referred to the great strides of hydro-electric development in Scotland. Hydro-electric power could, however, meet only about 3 per cent of British needs. They were now seeking to develop Welsh water power potential and he deplored the opposition from some circles there. The most satisfactory policy might be to take the Welsh critics to Pitlochry to demonstrate how power helped to make a centre instead of destroying it. Although deficient in water power by foreign standards the country was not deficient in enterprise or energy. He cited the developments at John Brown & Co. at Clydebank and at other plants as evidence, but urged a solution of present problems by an increased 10 per cent effort per day on the part of all in industry.

General view of the Electrical Section of the Scottish Building Centre

Sussex Industries Exhibition

THERE were a number of interesting exhibits of an electrical nature at the recent seventh Sussex Industries Exhibition at the Corn Exchange, Brighton. Stonegate Farmers, Ltd., of Tunbridge Wells, showed a modern egg sorting machine capable of dealing with many hundreds of eggs per hour. Hoover, Ltd., gave demonstrations of vacuum cleaners, floor polisher and washing machines. I.T. Office Equipment, Ltd., of Brighton, showed an "Olivetti" electric typewriter and telephone apparatus, among other equipment for office use. Fortiphone, Ltd., had a display of deaf aid apparatus, and QUIZ Electrics, Ltd., showed a warm air "towel" for drying faces and hands. Page & Miles, Ltd., of Brighton, showed a varied selection of electrical domestic apparatus.

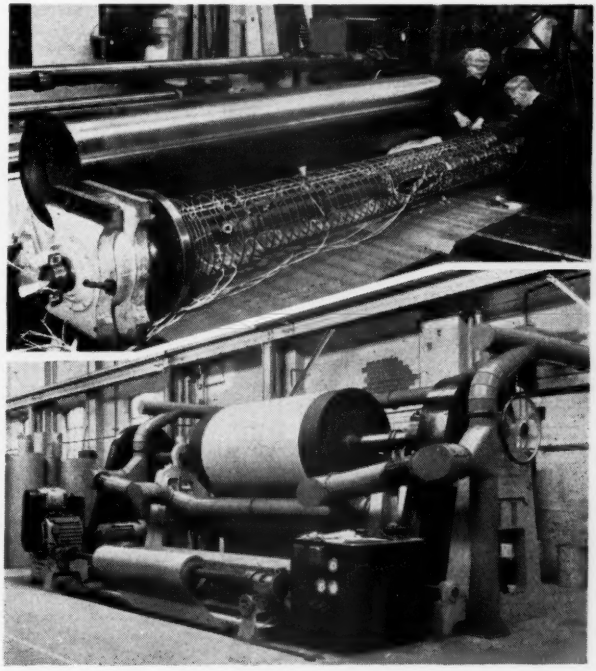
Electric Roller Heater

HEATED rollers are used in many industrial processes and various methods of heating the rollers are employed. An example is a 30 kW Metrovick electric roller heater incorporated in a machine at the Hollinwood factory of Ferranti, Ltd., which is claimed to be the largest resin-bonded-paper-tube making machine in Europe. It is capable of winding a laminated cylinder of resin-impregnated paper 9ft in diameter and 12ft long, successful operation depending to a large extent on the uniform heating of the pressure roller, which is 12ft 6in long and of 2ft diameter, maintaining a temperature of 170 deg to within plus or minus 3 deg C along the length of the roll. In addition, thermostatic general control of temperature is required to within plus or minus 3 deg C.

To achieve such close limits and avoid an over-long heating-up time it was decided to split the heater into two main sections of 15 kW, each section being distributed over the length of the roller. One of these sections was split again into three entirely independent banks separately controllable and having loadings of 6 kW, 3 kW and 6 kW respectively.

The heater comprises tubular sheathed elements which consist of a spiral of high grade heat-resisting wire tightly embedded by a special process in a mineral insulator, enclosed solidly in an outer sheath of $\frac{5}{16}$in tube of a non-scaling, non-corrodible alloy. The process ensures that the spiral is held immovably at the centre of the bore so that an even thickness of insulation separates it from the sheath. The elements, which are carried on a fixed spider, are arranged to give a greater heat output at the roller ends to compensate for the greater heat loss in that region, thus ensuring uniform heating along the entire length of the roller.

The temperature is controlled by means of ether radiation thermocouples mounted on the heater spider, but arranged to measure the temperature of the internal roller face. Tests revealed a high degree of uniformity of temperature along the length of the roller, the maximum divergence being plus or minus $1\frac{1}{2}$ deg C and there was no difficulty in maintaining the general temperature within the required limits.



A 30 kW Metrovick heater being wired before insertion into the pressure roller and (*bottom*) **the largest resin-bonded-paper-tube making machine in Europe fitted with Metrovick 30 kW electric roller heater, the pressure roller being shown below the paper winding cylinder**

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

British Museum Reading Room

THE description of the new lighting installation at the British Museum Reading Room in the *Electrical Review* last week recalled a description, perhaps in less precise terms, of the first installation of electric lighting in 1880.

I looked up the reference in a book by William Blades called "The Enemies of Books" and found the following:—

> "If only steady and moderate in price it (electric light) would be a great boon to public libraries. The electric light has been in use for some months in the reading room of the British Museum and it is a great boon to the readers. The light is not quite equally diffused and you must choose particular positions if you want to work happily. There is a great objection too to the humming fizz which accompanies the action of the electricity. There is a still greater objection when small pieces of hot chalk fall on your bald head, an annoyance which has been lately entirely removed by placing a receptacle beneath the burner. You require also to become accustomed to the white light before you can altogether forget it, but with all its faults it confers a great boon upon students, enabling them not only to work three hours longer in the winter time, but restoring to them the use of foggy and dark days in which formerly no book at all could be perused."

London, W.C.2. E. B. SAWYER,
Manager, Lighting Service Bureau.

Electricity Decentralization

IN its election manifesto the Conservative Party said: "In gas and electricity, as in other nationalized industries, excessive centralization has fettered local initiative and autonomy and has caused unnecessary delay and duplication of staff and expenditure. The former system of a Central Electricity Board and Electricity Commissioners should be restored and immediate consideration should be given to a scheme for decentralizing control of generation. In both gas and electricity municipalities and private enterprise should have the opportunity to put forward their claim to re-enter the field."

In my opinion the reappointment for a further term of the chairman, deputy chairmen and other members of the British Electricity Authority by the Minister of Fuel and Power indicates a continuance of the present system.

Many people consider that plans for the reorganization and decentralization of the electricity supply industry should have been presented to the House of Commons before the expiry of the agreements of the members of the B.E.A.

There is scope for the formation of an association to take steps to present a protest to Parliament and I would be willing to undertake the organization of such a body. As I am a servant of the nationalized industry it is undesirable to reveal my identity, I therefore sign myself,

FORMER BOROUGH (AND COMPANY) ENGINEER AND MANAGER

South African Submarine Cable

THE possibility of laying a high-voltage submarine power cable from the shores of Table Bay to Robben Island is being considered by the Union Defence Department. The underwater distance is about 3½ miles. Representatives of the Defence Department, the Electricity Supply Commission and the Cape Town Electricity Department recently saw a colour film of the making in Delft, Holland, of 3½ miles of 50 kV cable and how it was laid across a deep river in Zeeland.

After the show a senior army officer said that an alternative source of electric power for Robben Island had been under consideration for some years. At present the island generated its own power for domestic and military needs. Although the supply from this source was adequate, maintenance costs were high. Instead of adding to those costs and being isolated in the event of a breakdown, it was felt that it would be more economical in the long run, in spite of the initial high cost, to lay a high-voltage cable from the mainland, leaving the existing power plant as a standby. Cape Town's city electrical engineer said that if such a cable was laid the pooled power station of Cape Town would be able to supply the electricity.

Gas *versus* Electric Cooking

Some Points that Demand Attention

By W. J. L. JAMES

FOR many years the contest between advocates of gas and electric cooking has been waged with kid gloves, but at last the two great contestants have come out into the open and have entered the arena. The struggle will be long and there will be heavy fighting for supremacy but it will be the housewife who will ultimately decide the issue. As supporters of the domestic electric cooker let us, for the moment, forget our opponents and study the weaknesses in our own camp, for it is these weaknesses which have allowed our opponents a points lead.

We thought we had it "in the bag," but in actual fact we have been slipping and slipping pretty badly. We have been too busy in other directions to study the housewife's needs and have been complacent enough to believe that we are the better judges and that she must accept our ideas instead of her own. The ever-increasing output of gas cookers as compared with that of electric cookers is a reflection of her disapproval.

Gas Enterprise

It might be asked, "What is wrong with the modern electric cooker and why does it lag behind its rival? It is pleasing to the eye." Granted—so is a peacock, but it can't lay eggs. In many respects the modern electric cooker is inferior to the pre-war type and a close study will show that production is suffering from outmoded ideas. The modern gas cooker, on the other hand, is the outcome of a keen, active and forceful industry which has gone all out to capture the housewife's views and ideas and embody them as far as possible in its products. The modern gas cooker is not only good to look at, it is an extremely efficient piece of equipment and is proving itself a menace to the present day electric cooker.

What is there about the modern electric cooker to which the housewife takes exception? This is an exceedingly important question, and in order to understand the housewife's views we must dissect the cooker and examine the parts point by point, commencing at the head.

In the majority of cases hobs are too small with the result that boiling plates are fitted almost to the edge of the hob, thus preventing a nest of utensils sitting on one hotplate. There is no room for spoons, forks, etc., without their being so close to the hotplates as to cause them to become as hot as the plates themselves.

Hobs and Hotplates

It would appear that hobs are standardized to approximate to 21in wide but this is a relic of the prefabricated council house and was born only through lack of available space in these miniature houses. Why, then, is the housewife condemned for evermore to these miserable little hobs.

Why has the loading of hotplates been reduced to a maximum of 1,800 watts? Where speed is all important the load should be increased—not decreased—and should, to compete with gas, be of the order of 3,000 watts. At present, half the hotplates are radiant and half solid, which means that the user needs two sets of utensils, light and heavy. This is not so with gas; the lightest and cheapest will suffice. Hotplates must be designed so as to be as effective as gas rings. In short, an electric cooker should be capable of doing everything a gas cooker can do.

Grill boilers are the most inefficient pieces of equipment that have ever been fitted to electric cookers. They were introduced many years ago and were very quickly discarded by electric cooker pioneers. These grill boilers were revived and subsequently reintroduced on the score of lower production costs but the housewife is alive to the fact that they are more costly to use and are not so useful as the separate hotplate and grill. By all means reduce production costs, but not by resurrecting obsolete apparatus. Picture

the reaction of "mere man" if the motor car industry decided, on the score of cost, to dispense with all starter motors on cars and reintroduce the old fixed starter handle outside below the radiator.

Why have crown plates been dispensed with? These are a most useful adjunct and guard against spillage from overboiling and rust particles falling from hotplate cradles on to food placed in the grill chamber for keeping warm.

Housewives much prefer light grey interiors. Yet manufacturers persist in using almost black enamel. Light interiors show exactly where the dirt and grease lie and it is for this very reason that interiors should be finished in light enamel.

Ovens too Small

Having regard to the fact that the range of domestic cookers is limited to two models, the oven in the majority of cases is too small and frequently of the wrong shape.

In refrigerators there is a wide range of domestic models from 1 cu ft to 10 cu ft, catering for all sizes of families, yet the electric cooker is made with only two sizes of ovens, i.e., small and very small instead of large and very large. It is well known that an overstocked refrigerator cannot function properly in keeping food sweet and so with the electric cooker if the oven is too small it cannot cook properly. In many cases ovens are of the wrong shape, being built deep and narrow instead of square, or shallow and wide. With a deep and narrow oven it is extremely difficult to remove anything from the back without completely emptying the oven.

Are we standardizing too much on various types of thermostats and fitting too many? After all, a three-heat switch will give a high degree of control and one simmering switch per cooker should be sufficient to meet the average needs. With the advent of a 3 kW hotplate governed by a multi-way switch it may well be that this, together with one other 2 kW radiant plate fitted with a "Simmerstat," will meet all normal requirements for a small cooker. Incidentally, the 3 kW hotplate will need to be so designed that the heat is concentrated from the centre outwards, so that saucepans of any size can be used effectively without waste of heat, in the same way as a gas ring.

It does not appear that thermostatic oven control is favoured by all housewives. Some seem to prefer top and bottom oven heating with switch control, the contention being that ovens fitted with a thermometer and top and bottom elements with three-heat switches offer a greater degree of control than side and bottom heating with a thermostat. The housewife should therefore be given a choice.

The following summarizes the improvements the housewife demands:—(1) Rapid boiling radiant plates; (2) Larger hobs, not less than 25in wide and 20in deep; (3) Discard grill boilers; (4) Reintroduce crown plates; (5) Light grey oven and grill chamber interiors; (6) Larger ovens—not less than 3,500 cu in net cooking space for a small cooker; (7) Removable oven interiors for easy cleaning; (8) Separately controlled grills.

Meeting the Challenge

The housewife has thrown down the gauntlet and we are truly alarmed at what is happening. Let us therefore take up the challenge and produce a cooker worthy of her demands, always bearing in mind that the kitchen is the most important place in the home where only the best is good enough, be it cooker or tin opener.

The damage which has already been done is not irreparable but it will take ten years to get back those electric cooker consumers who have turned to gas. The gas industry is fully alive to our weaknesses and is cashing in whilst the "going is good." Its method is to sell rather than hire; that is why it will take so long for us to recover our losses of the past few years.

Electric cooker manufacturers appear to "shy" at producing a really first-class cooker on the score of cost and yet tens of thousands of potential electric cooker users are being lost each year—why not produce the job and let the housewives judge? If the cost of such a cooker is likely to be so prohibitive—which is doubtful—is it not high time that there was concerted effort by all the manufacturers and a pooling of production ideas for standardizing? Only in this way can we hope to stem and finally overcome the activities of our rivals.

Ideal Home Exhibition

The Ideal Home Exhibition of 1953 will be held at Olympia, London, from 3rd to 28th March.

The Approaches to Lighting

I.E.S. Presidential Address

IN his presidential address to the Illuminating Engineering Society in London on 14th October Dr. W. J. Wellwood Ferguson, M.B., Ch.B., dealt with some of the many aspects of lighting which required co-operation between widely differing interests. Lighting problems, said Dr. Ferguson, must on this account be approached along several distinct and separate lines, amongst them the physical, physiological and psychological.

The application of fluorescent light to special industries, such as coal mining, weaving, or steel production and the æsthetic problems raised by its effect on such things as food, decorations, or the female complexion all called for special consideration.

Dr. W. J. Wellwood Ferguson is senior ophthalmic surgeon at the Royal Infirmary, Sheffield, and lecturer in ophthalmology at Sheffield University

There were many and varied forms of expression of visual fatigue, frequently called "eyestrain." Its assessment was not a simple task. It was difficult, for example, to determine how much of the so-called fatigue was associated with the visual task and how much was due to other factors.

The question of pathological effects of fluorescent lighting had been raised from time to time, more especially on the Continent. The eye was adapted to receive and perceive the visible waves, but many of the invisible waves entered the eye to a greater or lesser depth and, while not perceived, might cause pathological effects due to the destruction of tissue. Under ordinary conditions no organic lesion of the eye as a result of exposure to visible rays had been established and, again under ordinary conditions, the retina would appear to be immune from fatigue thereby.

So far as the retina was concerned there was no evidence of any lesion being produced by ultra-violet waves. In any case only about 3 per cent of the shorter waves reached the retina and it was, therefore, extremely unlikely that any pathological effect in the deeper tissues could occur. The emission of ultra-violet light from fluorescent lamps was confined to the longer wavelengths and was in fact less in intensity than that present in daylight in a clear atmosphere. It would seem that the chances of harmful effects from ultra-violet radiation from fluorescent lamps, except under extraordinary conditions, must be extremely small.

How far retinal disorders resulting from exposure to the sun's radiation were due to the shorter wavelength as opposed to the visible and ultra-violet wavelengths, had not so far been precisely determined. Flicker was also mentioned as a subject on which further work was required.

Dr. Ferguson endeavoured to indicate the main approaches to the problems of illuminating engineering and went into some detail about those with which he was in daily contact. The lighting engineer, he said, sought for formulæ whereby the recommendations of the physiologist might be converted into terms of the illumination, or brightness, necessary for the particular tasks in hand. To the manufacturer the problem was one of designing and constructing the necessary light sources and fittings. Whether or not the result was successful depended on many variable factors and, while the result might be efficient, it might at the same time fail to be either economic or æsthetically satisfying. The artistic approach, he said, was of itself a fascinating study but even more full of pitfalls and subject to vagaries of human variation. The Illuminating Engineering Society was the link which could bind all the varied interests together.

New Books

Street Lighting. By J. M. Waldram, B.Sc., F.Inst.P., F.I.E.S. Pp. 431 + xvi; figs. 209; index. Edward Arnold & Co., London, W.1. Price 65s net.

This book, the latest volume to be published in "The Roadmakers' Library," is a very worthy successor to those which have preceded it. The subject is a complicated one and a reputation, as well as an opportunity, could easily be lost by an inferior book, but Mr. Waldram has tackled his task in a most workmanlike fashion and his reputation as an expert in street lighting, already no mean one, will now be higher than ever. He has combined theory and practice in a way which will be extremely valuable not only to every public lighting engineer but, perhaps more important still, to every engineer responsible for the public lighting in a local authority area.

Much of the contents of the book could be found only by a wide search in the literature and even then there would be lacking the guidance and critical selection of someone who has been steeped in his subject for many years. The different sections of the book deal respectively with principles, the effect of light distribution, height, spacing, etc., with planning installations and with equipment, i.e., sources, lanterns, columns and auxiliaries. There are two chapters on miscellaneous matters, some useful appendices and a good index. The book can be recommended wholeheartedly and without reserve.—J.W.T.W.

Electric Fuses. By H. Läpple. Pp. 173; index. Butterworths Scientific Publications, Bell Yard, Temple Bar, London, W.C.2. Price 25s.

This work, which has been written by the chief engineer of the h.v. fuse and overvoltage protection department, Siemens-Schuckertwerke, Berlin, is a critical résumé of the published information on fuses with particular reference to practical and commercial engineering aspects. Both l.v. and h.v. fuses are included in the scope of the work and a comprehensive list of references with abstracts forms the latter part of the volume. In this way much useful information is provided on the subject of fuses and their application.

As in many other branches of engineering, the sum total of knowledge tends always to increase and this book should appeal to those concerned with the basic principles and practical application of fuses up to the highest powers. Special fields of application for fuses are also included and although a complete list cannot be given here, distribution transformers, voltage-transformer protection, and capacitors for power factor improvement will serve as examples. They will also indicate that the viewpoint is not that of a pure scientist but that of an engineer engaged in developing industrial products. The work is informative and up to date and the book should be of undoubted interest and service to electrical engineers over a wide field.—J.P.

Road Transport Law. By L. D. Kitchin, A.M.Inst.T.; revised by E. K. Wenlock. 8th edition. Pp. 135. Published for *Motor Transport* by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Price 8s 6d.

Recognized as a standard work of reference, this book enables the "non-legal" person easily to understand the various Acts and Regulations affecting the construction and operation of commercial and public service vehicles. The legislation is presented in summarized form, but the reference system gives the official titles, so that any particular Act or Order can be consulted. The present edition has been extensively revised to bring it up to date.

Books Received

Televis'on. By F. Kerkhof and W. Werner. Pp. 434; figs. and index. Philips Technical Library. Cleaver-Hume Press, Ltd., 42a, South Audley Street, London, W.1. Price 65s in the United Kingdom.

Electrical Construction, Testing and Repair. Edited by E. Molloy. Pp. 184; figs. and index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 17s 6d.

Electrical Drafting and Design. By Calvin C. Bishop. Third edition. Pp. 367; figs. and index. McGraw-Hill Publishing Co., Ltd., McGraw-Hill House, 95, Farringdon Street, London, E.C.4. Price 38s 6d in the United Kingdom.

Aircraft Carrier Operation

Organization of Electrical Department of the "Illustrious"

IN his inaugural address as chairman of the Southern Centre of the Institution of Electrical Engineers at Portsmouth on 1st October Comdr. (L) J. C. Turnbull (Naval Electrical Department, Admiralty, Bath) dealt with the administration of the electrical department of the fleet aircraft carrier *Illustrious* in her capacity as a trials and training carrier.

This ship was commissioned in 1940, displaces some 20,000 tons and is driven by geared steam turbines of 110,000 s.h.p. through three shafts, giving her a speed of 30 knots. The amount of electrical equipment is large and fairly complex, though not nearly so large or complex as in a modern ship; much of it is awaiting modernization, so that the maintenance organization and methods differ from those of a modern ship. The address therefore outlined the more important items in order to indicate how the electrical department was organized to deal with maintenance for the efficient operation of aircraft, the ship's electrical department being separate from the air electrical department and differently organized.

The first section of the address dealt with electricity generation and distribution. Six geared turbines driving 400 kW water cooled generators and four small diesel sets for emergency purposes delivered d.c. at 225 V to a ring main inside the armoured portion of the ship, extended fore and aft on each side of the ship by feeder cables of the same size and type to serve the main gun armament and certain other heavy electrical needs near the bow and stern. The arrangement of switchgear and main control board was described as well as the three "low power rooms" in which the main supply was converted to various voltages and frequencies for special purposes. The machines in these rooms derived energy from the generator side of the main switchgear (not the ring main) and in the event of a generator failure an auto change-over switch would step round until it found a running generator to maintain continuity of supply.

The second section of the address briefly described electrical equipment for intercommunication, flight deck lighting and traffic control, hangar lighting (40 kW), ventilation, navigation and aircraft direction, gun control, ammunition conveyors, visual signalling projectors, steering gear, cranes, winches, capstans, lifts, etc.

In the engine room and boiler auxiliaries section alone there were 224 motors; the normal lighting load was of the order of 220 kW, space heating accounted for 450 kW, cooking and baking for 385 kW and there were 320 fans, apart from table fans, in the ship. There were 600 telephones with three exchanges, a system for broadcasting orders, and large numbers of radio communication and radar sets with data transmission systems disposed about the ship to minimize trouble due to action damage. All these equipments required numerous sets of conversion machinery and, moreover, owing to distortion of wave forms and transients it was not always possible to use one set of conversion machinery for several radar or radio sets; similarly radar and gunnery computing systems could not be operated from a common source of supply. These considerations added to the difficulties of the maintenance staff.

The third portion of the address outlined at some length the training, qualifications and duties of officers and men of the electrical department.

The fourth section described in even more detail the organization and procedure of maintenance teams and the methods of carrying out repairs and adjustments both when in harbour and at sea.

Hull Dock Improvements

THE British Transport Commission has authorized an expenditure of £950,000 on the installation of modern cranes and electrical equipment at King George Dock, Hull. The work is expected to take three or four years. The change-over from d.c. to a.c. will mean relaying the whole of the cable system and the provision of transformers and switchgear.

Beet Sugar Production

Modernization of Generation and Factory Electrical Equipment

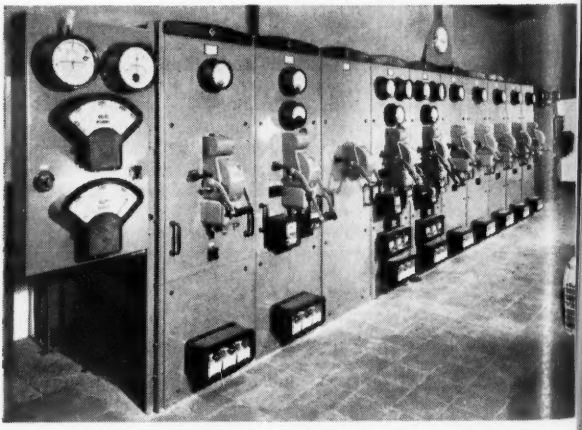
WITH the beginning of the harvest of the sugar beet crop in September the East Anglian Group of the eighteen factories in the British Sugar Corporation commence their non-stop campaign of sugar extraction. The beets are brought into the factories straight from the fields to be cleaned, weighed, sliced or shredded before passing into the diffusing plant. After diffusion the juice is pumped via defecation, filtration and concentration stations to the centrifuges where the molasses is extracted and the sugar discharged for conveyance to the refineries. The campaign normally lasts about sixteen weeks during which period the plant is operated continuously at maximum capacity.

In recent years modernization and development have required the installation of new power station and factory electrical equipment. The Contract Department of Crompton Parkinson, Ltd., has carried out electrical installations at Felstead, King's Lynn, Ipswich and Bury St. Edmunds. The last-mentioned factory, the largest in the Corporation, now has a capacity of 4,500 tons of beet per 24 hour shift, extracting some 800 tons of sugar in the equivalent period.

The achievement of this output was assisted by the complete re-organization of the electrical generation and distribution systems prior to the 1950–51 campaign. The original plant, installed in 1923, comprised small capacity turbo-alternator sets generating at 220 V, 3-phase, which was the accepted Continental practice at that time. With the growth of electrical demand, and additional extensions, the total load on the system had reached some 5,500 kVA, and to avoid the problems involved in generating and distributing this amount of power at 220 V, a new scheme was prepared to provide for generating at 3·3 kV and distributing to transformer stations to step the voltage down to 220 V for local distribution.

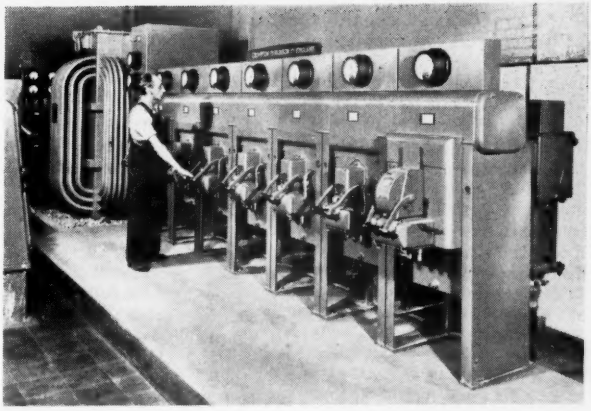
The new generating plant consists of two 2,800 kVA turbo-alternator sets supplied through W. H. Allen, Sons & Co., Ltd. The steam input at 285 lb/sq in is 44·25 ton/hour. Exhaust steam at 31 lb/sq in is used for process work, for which purpose it needs to be supplemented by the addition of some 17·5 tons/hour, consisting of various engine exhausts together with some boiler steam supplied through reducing valves. The power house switchgear together with all high voltage and low voltage distribution switchgear, and power and lighting feeder cables

Main switchboard in the power house



were supplied and installed by Crompton Parkinson, Ltd., the transformers being provided by their associates, the British Electric Transformer Co., Ltd.

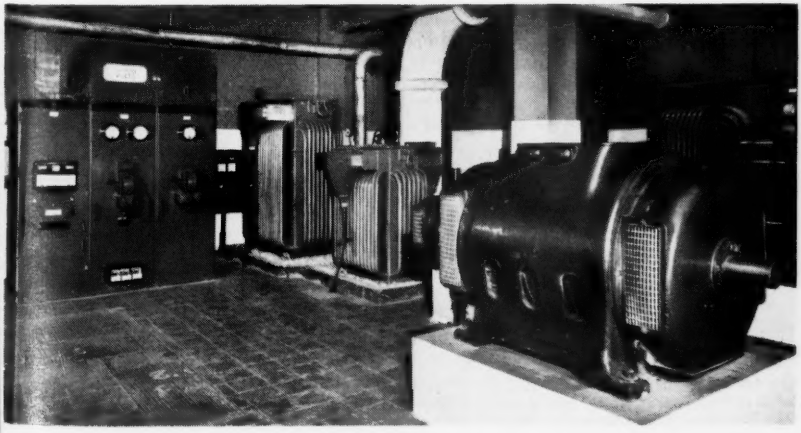
The main switchgear comprises ten "DA2" truck-type units of horizontal isolation and draw-out pattern, rated for 75 MVA at 3·3 kV. The two alternator units are of 600 A capacity, equipped with Merz-Price protection, metering and synchronizing gear, and all outgoing feeders are rated at 300 A capacity, and equipped with earth leakage and over-current relays with inverse and definite minimum time lag. Separate cubicles accommodate the automatic voltage regulator, excitation and neutral earthing equipments. To provide against inadvertent tripping and to reduce unnecessary sensitivity in the system the protective equipment was designed on simple and straightforward lines consistent with maintenance of adequate safeguards against major fault operation.



Typical low voltage distribution substation with switchgear directly connected through isolator to the transformer

A bus-section circuit breaker enables a 11/3·3 kV supply to become available from the Eastern Electricity Board for starting station auxiliaries and provides for a restricted demand to be taken during the off-campaign season for maintenance and stand-by purposes; the supply authority equipment is also of C.P. manufacture. Use of selected l.v. interconnectors also permits of small power loads and lighting being operated during this time without energizing the factory 3·3 kV network.

Incoming supply substation and 375 kVA synchronous condenser



The station switchboard controls the distribution of power to seven main substations all designed on closely similar lines, three being of 600 kVA and four of 1,000 kVA capacity. Where necessary, high voltage circuit breakers of "Klad A" pattern provide local protection and control, each substation being equipped with "Klad A" low voltage feeder distribution boards with trunking to the transformer secondary terminals. These trunkings were specially designed to incorporate hinged front panels on which instruments are fitted.

The substations serve regionalized zones of power using two capacities of transformer only, as follows: Power station loads and vicinity, 600 kVA; lime kiln and effluent pumps, 600 kVA; beet end No. 1, 1,000 and 600 kVA; beet end No. 2, 1,000 kVA; sugar end, 1,000 kVA; pulp drying and boiler house, 1,000 kVA. Lighting services are centralized on one multi-circuit board at the power house and remain separate from all power feeders throughout the factory. A 375 kVA, 220 V synchronous condenser employed in the original installation is now utilized at one of the more heavily loaded substations to reduce the total kVA demand on the station alternators.

The simplicity of design and operation of the whole equipment is found to be of great advantage in a manufacturing process which calls for continuous maximum effort over a sustained period and where continuity of supply is essential.

Trostre Tinplate Works

Visit by Minister of Supply

MORE than 1,200 guests were entertained to lunch by the Steel Company of Wales, Ltd., on 7th October on the occasion of the visit to the new Trostre Tinplate Works of the Minister of Supply, the Rt. Hon. Duncan Sandys, P.C., M.P., and members of the Iron and Steel Institute. For the occasion the tinplate warehouse had been transformed into the semblance of a huge marquee, with an ante-room in which the guests were received by Mr. E. H. Lever, chairman of the company, and Mrs. Lever, and by Sir Charles and Lady Bruce-Gardner. Many overseas members of the Iron and Steel Institute were also present, including the distinguished American metallurgist, Dr. E. C. Bain, Dr. Magnus Tigerschiöld, Mr. S. Fornander, General Direktor Dr. F. Mayer-Mallenau, General Direktor Dr. J. Oberegger, Mr. W. C. F. Poensgen and Mr. G. Schelderup.

First Stage of Programme

In welcoming Mr. Duncan Sandys, Mr. E. H. Lever, chairman of the Steel Company of Wales, Ltd., said that that day marked the conclusion of the first and most important stage in the development programme of the sheet and tinplate industries of South and West Wales. It was indeed "the penultimate stage in the transfer of hard physical toil from the backs of men to happily unfeeling machines." The Abbey hot strip mill, formally opened in July last year, had a total capacity sufficient for all foreseeable needs but the new mill at Trostre, large though it was, would not be able to supply all the modern tinplate required. Trostre, however, was only one part of the further development in the industry.

"The iron and steel industry," he continued, "cannot afford to stand still and the large project which we and other firms have in mind, and in many cases on the drawing board, must be carried through whatever the ruling politics of the day, because steel products are the raw material of our great engineering industries and form the foundation, therefore, of the whole economy of the country."

Industry's Competitive Power

Responding, the Minister of Supply said that with the magnificent plant which had been installed Trostre should be able to compete favourably in quality and price with the product of any other country in the world. Of the iron and steel industry generally, Mr. Sandys said that pig iron production was now running at a rate of a million tons a year greater than it was twelve months ago. Provided there were no unexpected difficulties over raw materials the British steel production in 1953 should beat the previous all-time record of 16¼ million ingot tons by a substantial margin.

The toast "The President and members of the Iron and Steel Institute" was proposed by Sir Charles Bruce-Gardner, Bt., deputy chairman of the Steel Company of Wales, Ltd., and was responded to by Captain H. Leighton Davies, C.B.E., J.P., President of the Institute and assistant managing director of the company.

The guests afterwards made an extensive tour of the plant.

Distortion in Welding

Methods of Minimization

THE subject chosen by Mr. A. Robert Jenkins for his inaugural address as president of the Institute of Welding, delivered in London on 8th October, was distortion in welded work. Comparatively little had been written on this subject, said Mr. Jenkins, probably because so many variables affecting distortion were encountered in shop practice; they gave rise to very mixed results, which made it extremely difficult to arrive at a common basis on which to fix reliable rules.

The following ten variables were among those which had to be considered in relation to this problem: type of material and thickness, method of preparation of plate edges, design, amount of restraint on plates during welding, accuracy of set-up, type of electrode, size of electrode and current, rate of deposit, number of runs, manual or automatic welding.

Distortion was produced by shrinkage, the degree of which could be affected by all the variables mentioned. Shrinkage was the residual contraction in volume of the metal after cooling, and distortion ensued if the temperature distribution had not been uniform, as was the case with arc welding.

Mr. Jenkins first gave the results of shop tests designed to show the extent of transverse and longitudinal shrinkage and then discussed practical methods of preventing and reducing distortion, of counteracting it when it had occurred, and of controlling it by staying and strutting; finally he described how welded vessels, which, through accidents had been distorted almost beyond repair, were made usable again by special treatment.

Size of Electrodes

The results were then shown of a number of tests for distortion carried out (manual arc welding with electrodes of various gauges) on a ½in thick plate with V preparation; the tests showed that a greater degree of longitudinal distortion occurred when larger electrodes and greater currents were used, even when the plate was welded from the ends to the centre, a practice which was supposed to reduce distortion. On the other hand, according to examples cited by Mr. Jenkins, a greater degree of transverse distortion was to be expected when small electrodes were used with a greater number of runs. As transverse distortion was the more troublesome, it was the practice to make the weld with the minimum number of runs and at the maximum speed. Mr. Jenkins said that the correctness of this method was confirmed by the results of similar tests carried out on a 1 in thick plate welded manually and by the submerged arc process.

Preventive Measures

Referring to methods for the control of distortion, the president mentioned four ways of minimizing it. The first was to make initial allowances, to be added to the drawing dimensions, during the preparation of plates, and Mr. Jenkins suggested some figures which were based on practical experience in the construction of tanks and cylinders. Another method was to use a sequence of welding which balanced the contractional stresses, while a third was to ensure that plates were carefully prepared for welding, so that large gaps were not left in the joints. Fourthly, regarding transverse distortion, Mr. Jenkins again stressed the advantages of using large gauge electrodes and large currents with a consequent reduction of the welding time.

Where distortion had already occurred it could be corrected, as it had been caused, by local heat treatment with an oxy-acetylene flame; this method must, however, be very carefully applied if it was not to result in fresh distortion.

Restricting the movement of the plate during welding was one method of preventing distortion and Mr. Jenkins illustrated how it could be carried out, when, for example, flanges were to be welded on to two identical objects. It was first necessary to tack-weld the flanges into position, after which the two objects were clamped back

to back with packing between them. Welding was then completed and the clamps broken after cooling. The president showed slides illustrating the various ways in which this principle could be applied to prevent the movement of the plate during welding and said that in every case in which it was used the edges after welding had remained perfectly straight. Other methods illustrated by Mr. Jenkins were the use of stays and struts to maintain shape during welding, and the pre-setting of parts before welding, the former being particularly valuable in the case of welded tanks.

Electricity and Productivity

Important and Timely Conference

WITH a view to accelerating industrial electrification in this country, an Industrial Productivity Conference is being held later this month. It is being organized by the British Electrical Development Association, which has arranged a two-day programme to stimulate interest in the subject not only among industrialists but within the electricity supply industry itself.

The meetings are being held at the Institution of Electrical Engineers on 28th and 29th October, and they will be attended by representatives of many industrial and professional organizations, prominent industrialists and electricity supply people. Dr. Percy Dunsheath, C.B.E., president of E.D.A., will be the chairman at an open session on the morning of 28th October and will deliver an address.

Following this Mr. A. R. W. Low, C.B.E., D.S.O., Parliamentary Secretary to the Ministry of Supply, will speak on "The National Need for Greater Productivity." Then there will be three addresses on "Electricity and Productivity." Sir Norman Kipping, director-general, Federation of British Industries, will deal with the subject as it affects industry generally; Col. B. H. Leeson, O.B.E., president, I.E.E. and director of the British Electrical and Allied Manufacturers' Association, with the electrical manufacturing aspect; and Lord Citrine, P.C., K.B.E., chairman, British Electricity Authority, with the electricity supply industry's part. The subsequent discussion will be opened by Sir Vincent Tewson, C.B.E., M.C., general secretary, Trades Union Congress.

At a conference luncheon at the Savoy Hotel the principal guest will be Mr. Geoffrey Lloyd, Minister of Fuel and Power.

In the afternoon there will be a Members' Session, at which delegates will be welcomed by Mr. H. Nimmo, chairman of the E.D.A. Council. Mr. E. R. Wilkinson, commercial manager, B.E.A., will give an address on "Higher Industrial Production and the Contribution that Electricity can Make" and Mr. C. T. Melling will speak on "Advising and Assisting Industrial Consumers: A Service by the Area Boards." A discussion will follow.

After tea at the Lighting Service Bureau a number of films will be exhibited, including "A Case for Handling," the E.D.A. film on materials handling methods.

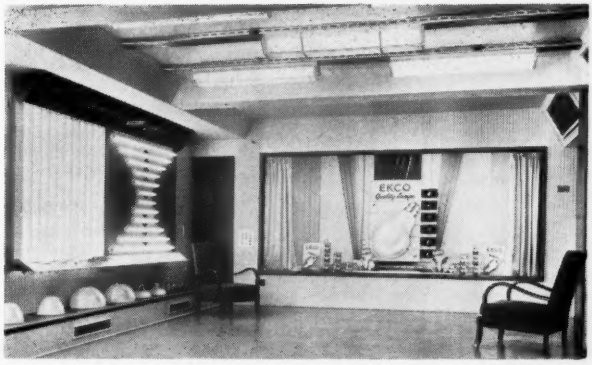
On the morning of 29th October there will be another Members' Session, at which Mr. V. W. Dale, general manager and secretary of E.D.A., will make some introductory remarks on "The E.D.A. Electricity and Productivity Campaign." He will be followed by members of the E.D.A. staff who will give short lectures after each of which there will be allowed time for discussion. Mr. W. Robinson, B.Sc., will deal with "Better Lighting for Greater Productivity"; Mr. E. M. Ackery, A.F.C., B.Sc., with "Electric Heating in Relation to Productivity"; and Mr. L. Landon Goodman, B.Sc., with "Materials Handling—an Aid to Greater Productivity." A general summing-up will be made by Mr. J. I. Bernard, B.Sc., chief technical officer, E.D.A.

The proceedings will conclude with a buffet luncheon and reunion at the Lighting Service Bureau.

It is hoped that several of the E.D.A. series of productivity handbooks will be available by the time the conference is held.

NEW LIGHTING SHOWROOM

Practical Demonstration Arrangements



View of the demonstration "window" end of the new showroom

THE new showroom of Ekco-Ensign Electric, Ltd., at Preston House, 45, Essex Street, Strand, London, W.C.2, is decorated mainly in cream and gold, the timber panelling with a dark veneer satin finish contrasting well with the light walls and ceiling. The display is comprehensive and arranged for practical demonstration, the emphasis being on lighting rather than lamps with display cabinets to indicate the variety of types of lamp, fittings and general construction.

The ceiling is divided by the structural beams into five bays which conveniently divide the ceiling display. In the first bay is built a louvred ceiling and laylight. The two sections are identical in size and design and demonstrate the new standard honeycomb louvre with "warm-white" and coloured fluorescent lamps. A central laylight shows how the use of patterned glass can produce a textured effect.

The remaining bays have been equipped with metal channelling which enables fittings to be readily installed, taken down, or modified. The wiring runs through the channelling to socket outlets concealed behind grilles and controlled from local switch panels.

Full ranges of standard fluorescent lamps (including the new "white" 3,500 deg K lamp which gives 5 per cent more light than any other standard type) and tungsten filament lamps are shown. The latter are exhibited in an illuminated display cabinet. Another cabinet contains a range of "Ekco" projector lamps.

A feature of the showroom is the stage or show "window." At present it demonstrates dimming equipment for fluorescent lamps.

The stage is also used to display a system of u.v. lighting. The new fluorescent u.v. lamps are of the same sizes as the normal fluorescent lamps and they have the advantage that they can be rapidly switched on and off, providing an immediate source of rich ultra-violet radiation. Another important feature is that it is necessary to renew only the lamp as the Woods glass filter is in the form of a flat sheet or circular tube and it can be used indefinitely. For the present, these u.v. lamps are limited to 20 and 80 W sizes, but other sizes will shortly be available.

In areas where there are large mains voltage fluctuations, the series capacitor circuit will maintain the lamp alight at a lower voltage than will a normal circuit: this fact is demonstrated by a practical display unit while another unit shows how fluorescent lamps can be operated off d.c. circuits, provided suitable control gear is employed. Although the watts are approximately equal to the rating of the lamp, the luminous efficiency is higher than that of a corresponding wattage of tungsten lamps.

On the long wall opposite the entrance is a range of fluorescent industrial fittings suspended from a metal rack, and below are showcases for control gear and accessories, while three alcoves have been used to show diffusing glass fittings and industrial lighting equipment for tungsten lamps.

"Clean Food" Exhibition

THE S.W. Scotland Board co-operated in an exhibition arranged by the Clean Food Association in Greenock recently. Films were shown throughout the week and on the Board stand the use of electricity for washing machines, cooking, refrigeration, lighting and heating was stressed in practical displays. Among the equipment specially featured were G.E.C. refrigerators, Belling and Jackson "Giant" cookers, "Servis" and Burco washers.

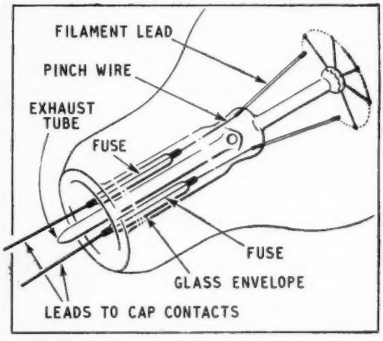
RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Lamps Fitted with Fuses

IT is announced by the GENERAL ELECTRIC Co., LTD., Magnet House, Kingsway, London, W.C.2, that all "Osram" general lighting service lamps from 40 W to 300 W, single coil, and from 40 W to 100 W, coiled coil, are now fitted with fuses, consisting of lengths of fuse-wire sealed in tiny glass tubes and incorporated in the two lead-in wires that carry the current to the filament. The fuses are hidden away inside the lamp stem and, even in a clear bulb, can scarcely be seen from the outside.

The purpose of the fuses is to minimize the risk of circuit fuses blowing, with the consequent inconvenience caused by other lamps on the same circuit being extinguished. The provision of this safety device in the whole range of g.l.s. lamps from 40 W to 300 W, which do not cost any more than lamps without fuses, is a development of interest to every lamp user.



Glass-sealed fuses in general service lamp

Projector Lamps

In this country the filament coils in projector lamps have hitherto been equally spaced. A more satisfactory arrangement has now been adopted in the "Osram" 750 W biplane filament A.1 projector lamps: the two outside filament coils of each plane are placed closer together than the two inside coils. It is explained by the General Electric Co., Ltd., that the object of the differential spacing is to ensure that the temperature over the whole surface of the filament is as uniform as possible, and that the resulting illumination is also evenly spread over the complete area of the screen. Tests have shown that an average life of at least 25 hours, together with a high efficiency, can be achieved with this new filament design.

Torpedo Switch

Included in the range of push-button switches manufactured by CASTELCO (GREAT BRITAIN) LTD., Castle Works, High Street, Old Woking, Surrey, is a neat through-type torpedo switch.

Castelco torpedo switch

A single-pole, alternate on-off switch of 1 A at 250 V rating, it measures 2in by $\frac{13}{16}$in by $\frac{13}{16}$in. The casing is of moulded plastic and is available in an attractive range of colours.

Dowel-Driving Hammer

A simple and speedy method of fixing brackets and clips, such as those used for securing pipes, conduit, cables, etc., has been evolved by KWIKFORM, LTD., Waterloo Road, Birmingham.

With the aid of the "Kwikform" dowel-driving hammer it is claimed that drilling and plugging are eliminated as the fixing dowels are fired direct into all kinds of iron, steel, timber, brickwork and certain types of concrete. To load the gun the barrel is withdrawn, the breech slide opened and the selected dowel and cartridge for the fixing required inserted. Firmly placing the gun against the material, it is then fired by pressing a button. The "Kwikform" hammer is supplied in a strong carrying case complete with cleaning brush, leather holding strap and a small supply of dowels and cartridges.

"Kwikform" dowel-driving hammer

Commerce and Industry

Lighting of Pedestrian Crossings

Power Plant for Canada

THE Ministry of Transport has sent to local authorities a circular dealing with the lighting of pedestrian crossing beacons. It indicates that they should be lit by day as well as by night with flashing lights (steady lights may be used in special circumstances) and that normally the beacons at each crossing should flash together.

A technical specification for electrically illuminated beacons, drawn up by a working party of engineers appointed by local authorities' associations, requires that the flasher shall give 40 (± 10 per cent) complete cycles a minute; provision for an increase to 60 or 80 cycles min, if required, is considered desirable. The illumination period is to be between 50 and 60 per cent of the cycle time, the dark period not exceeding ¾ sec under any conditions. The flasher mechanism must be of a type which remains in synchronism with the electricity supply frequency and is self-starting. The mechanism must be suitable for continuous operation for a period of at least three months without attention and at least a year without replacement of working parts, switching on and off a 100 W lamp. Radio interference suppression equipment is to be incorporated. Copies of the specification can be obtained by manufacturers from the Ministry.

Development in Iraq

We have received from the Iraqi Embassy in London a reprint of the laws and other information concerning the Development Board set up by the Government of Iraq. This body will be financed mainly from the Government's receipts from the oil companies operating in Iraq and it is charged with the duties of undertaking schemes connected with water conservancy, flood control, irrigation, drainage, industry, mining and communications. As regards the last item a statement of projected expenditure ncludes telegraphs, wireless and telephones for which a sum of 1,948,000 dinars (dinar = £1 sterling) is allocated in the 1951–56 period.

Fuel and Power Statistics

The annual Statistical Digest for 1951 of the Ministry of Fuel and Power has just been published (H.M. Stationery Office, £1 1s). In 221 pages (8½in by 11in) it presents a vast amount of information in tabular form relating to the production and use of coal, other minerals, electricity, gas, oil, etc. The volume forms a useful collective reference work but the leading statistics have already appeared separately in other forms. Thirty-nine pages (33 tables) are devoted to a wide variety of electrical matters; most of the figures are not later than those for 1950.

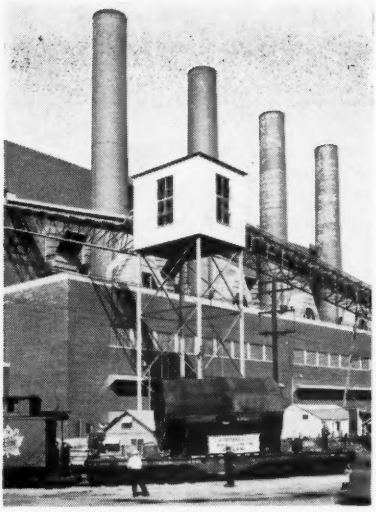
Zinc Price Lower

The Ministry of Materials has announced that from 9th October the price of good ordinary brand zinc has been reduced from £122 to £118 per ton delivered consumers' works. Premiums for higher grades remain unchanged.

Stators for Canada

One of the heaviest single-piece loads ever to leave the B.T.H. Rugby works by road was despatched recently on the first stage of its journey to Canada. It was a completely-wound stator of a 25,000 kW hydrogen-cooled turbo-alternator set for the Ford Motor Co. of Canada and will be installed at the company's works at Windsor, Ontario. The stator, weighing 97 tons, with its specially constructed fabricated steel transit skid made a total dead-weight load of 109 tons. Because of the size and weight of the load detours of over fifty miles had to be made. At Liverpool the stator was lifted on board the s.s. *Arabia* by the 250-ton floating crane "Mammoth." After crossing the Atlantic to the St. Lawrence River port of Sorel, the

Stator of B.T.H. 25,000 kW hydrogen-cooled turbo-alternator for Canada being lifted on board the Cunard steamer "Arabia" at Liverpool Docks



A 167-ton stator core made by C. A. Parsons & Co., Ltd., arriving at the Richard L. Hearn power station, Toronto, of the Hydro-Electric Power Commission of Ontario

load was rail-hauled to site by special train. The steam turbine is a double-extraction 3,600 r.p.m. machine with steam conditions of 800 lb/sq in at 800 deg F; the alternator has an output of 25,000 kW at 13,800 V, 3-phase, 60 c/s.

A 167-ton stator core, built by C. A. Parsons & Co., Ltd., of Newcastle-on-Tyne, has arrived at the Richard L. Hearn generating station, Toronto, of the Hydro-Electric Power Commission of Ontario. On arrival at Sorel, Province of Quebec, a special section of railway track had to be laid as this load was one of the heaviest single rail shipments ever made in Canada. Two C. A. Parsons traffic representatives, Messrs. T. Cockburn and J. Johnson, met the ship at Sorel to superintend the journey to Toronto. The train moved during daylight hours only and made several detours to avoid elevated curves on its five-day journey. The stator core is for the third unit of the station. When this plant is completed early in 1953 it will have an ultimate capacity of 536,000 h.p. The first two units of this station were also manufactured by C. A. Parsons & Co.

New Solder Company

H. J. Enthoven & Sons, Ltd., has formed a new company known as Enthoven Solders, Ltd. It will be divided into two divisions. One of the divisions, concerned with marketing of solid solders, is to be under the control of Mr. W. J. Myers, who is appointed to the board of the new company. The other is under the direction of Mr. F. C. Thompson. The new company, while being a separate subsidiary, is intimately associated with the parent group. The head office is at the same address as the parent company, 89, Upper Thames Street, London, E.C.4.

Purchasing Officers' Conference

Lt. Cdr. J. Gurney Braithwaite, Parliamentary Secretary to the Ministry of Transport and Civil Aviation, opened the 21st anniversary conference of the Purchasing Officers' Association at Harrogate on 3rd October. One subject discussed was "The Effect of Price Rings upon Industry." Mr. A. Elliott (vice-president) said that trade associations, which had many advantages, did not automatically imply price rings. He went on to state the purchasing officers' objections to price rings. In this he was supported by Mr. W. H. Napper (past president). A defence of price control arrangements was made by Mr. C. Hughes (E.L.M.A.) and Mr. T. H. Summerson (British Steel Founders' Association). Among other subjects dealt with was the future supply and price trend of paint, paper, plastics and materials. The Earl of Verulam gave a concluding address.

Speakers at the conference dinner on 3rd October were Lord McGowan, Mr. T. L. Garner (president of the Association), Mr. L. H. Drake and Sir Harry Garner.

Machine Tool Electrical Applications

Although at the International Machine Tool Exhibition recently held at Olympia, London, the Metropolitan-Vickers Electrical Co., Ltd., occupied a stand on which qualified engineers were available to give advice based on the company's long service to the machine-tool industry, it is a debatable point as to which afforded the greater interest, the company's own stand or the somewhat exceptional amount of Metrovick electrical driving and control gear with which many machine tools on the stands of well-known machine-tool manufacturers were equipped.

One example of the latter was the Swift-Summerskill planer. In this machine the table is driven by a 25 h.p. reversing motor to a speed range of 8 to 1 afforded by Ward-Leonard control, while the control is arranged to accelerate the machine operation between cuts if required. A.c. motors raise and lower the cross slide and the feed and rapid power traverse to the tool slide. A combined reversing and overrun limit switch in the bed serves for table dog operation. A floor mounted control cubicle houses the main, feed and cross slide contactors and relays, while the operating panel for the tool lifters, indicator lamps and combined "cut" and "return" rheostat is mounted on the slide column. Pendant push-button control provides "start," "stop," "inch cut" and "inch reverse" of the table, and "rapid power traverse" of the tool slides. This machine was

illustrated on p. 50 of the *Electrical Review* of 19th September.

All interested in machine tools will find much of interest and profit in a new Metrovick 56-page brochure "Machine Tool Drives" which was published just before the opening of the Exhibition. Special characteristics to suit various applications, speeds up to as high as 100,000 r.p.m., portable tools and W.L. control for planer drives, etc., are merely a few of the items and problems discussed and illustrated.

River Pollution Appeal

Last week the Court of Appeal, on the application of Counsel for the respondents, the Pride of Derby & Derbyshire Angling Association and the Earl of Harrington, postponed until December the hearing of the appeals of the defendants, the Derby Corporation, British Celanese, Ltd., and the British Electricity Authority, against the judgment of Mr. Justice Harman last April in the matter of the pollution of the Rivers Derwent and Trent.

Christmas Gifts

The first reminder we have received of the approach of Christmas comes from the General Electric Co., Ltd., which has sent us suggestions for out of the ordinary Christmas gifts. Among these we notice a home broadcaster which can be placed near a cot, and plugged into a radio receiver in another room; by switching on the radio the parents can hear at once if a child cries or needs attention. Other suggestions are a watertight handlamp, suitable for use in the garage, an electric glue pot and a light-weight hair dryer.

Educational

The calendar for 1952–53 of University College, London, which is now available, in addition to giving particulars of the various courses contains full information of the administrative organization and history of the College, scholarships, exhibitions, prizes, and bursaries.

The College of Technology, Birmingham (principal, J. Wilson, B.Sc., B.Com., M.I.Mech.E.), has instituted a new senior lectureship, the first of its kind in this country. Its subject is the human relations aspect of management, and it is part of the Department of Industrial Administration. It will cover the existing courses in psychology for supervision, industrial psychology, and personnel administration. In addition, it is hoped that some field studies can be undertaken and an advisory service set up to assist students in their personal development.

E.C.A. Gloucester Branch

At the recent annual dinner of the Gloucester and District Branch of the Electrical Contractors' Association the toast of "The City of Gloucester" was proposed by Mr. E. J. Rowberry and replied to by the Mayor of Gloucester, who advised contractors to take a bigger interest in national and local affairs to guard against the dangers of nationalization. Mr. W. T. Trace, president of the E.C.A., responded to the toast of "The E.C.A. and Allied Associations" proposed by Mr. J. P. Inglis. In replying to the toast of the guests and ladies, proposed by Mr. R. W. Stanton, Mr. L. C. Penwill, director of the E.C.A., expressed his regret that relationships between employers and employees were strained. He said that the will to work and pride in craftsmanship would dissipate much of our economic troubles.

Specialists and Sub-Contractors

The annual luncheon of the Federation of Associations of Specialists and Sub-Contractors is to be held at the Apothecaries' Hall, London, E.C.4, on 26th November. It is hoped that the Minister of Works (Mr. David Eccles) will be present.

Excess Profits Levy Guide

The Federation of British Industries has published a "Guide to the Excess Profits Levy," which explains, as simply as possible, the major provisions of E.P.L. The Federation points out that, even with such a booklet, it is impossible to cover every aspect of the legislation and members seeking specific information in the light of their own circumstances are invited to write to the Taxation Department of the F.B.I.

Two new lamp display pieces, showing (*left*) a Siemens lamp counter card and (*right*) a Metrovick fluorescent fittings display

Copies of the Guide can be obtained (price 1s), from the Federation, 21, Tothill Street, London, S.W.1.

Fluorescent Fittings Price Reductions

Members of the Electric Light Fittings Association and the Electric Discharge Lamp Auxiliaries Council have announced reductions in the prices of industrial lighting fittings including fluorescent fittings.

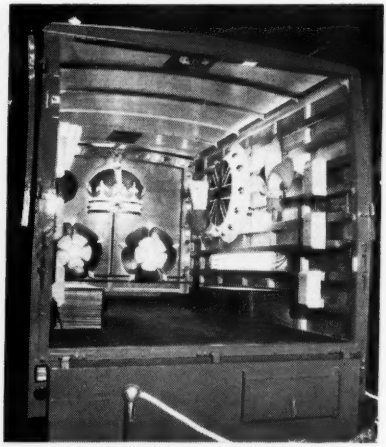
Service Centres Competition

Teams from 94 Electricity Service Centres throughout the South West have prepared novel ideas for window and interior showroom displays for the preliminary rounds in the South Western Electricity Board's Area Display Competition being held this week. This third annual competition offers equal opportunity to large and small Service Centres throughout the South Western Area. The theme is "The New Home—and how Electricity can make life easier for those who will live in it." Entries have been submitted from 19 Service Centres in Bristol Sub-Area, 27 from Taunton, 22 from Devon and 26 from Cornwall. The panel of judges for the final will be Mr. A. Baird, display expert of Decor Contemporary Art and Design Ltd., and Mrs. M. Forrest of the Council of the Electrical Association for Women.

Travelling Showroom

Before the war the Siemens travelling showrooms, carrying a display of electrical appliances, were familiar throughout Great Britain. A similar scheme was inaugurated on 6th October, when a mobile display of Siemens "Chrysaline" Coronation decorative devices took the road. It will tour the country until 12th December, to assist those who are planning Coronation decorations and illuminations.

The travelling showroom of Siemens Electric Lamps & Supplies, Ltd., which is touring the country showing Coronation decorations



E.C.A. Annual Dinner

Mr. L. C. Penwill, director and secretary of the Electrical Contractors' Association, informs us that the Association's annual dinner will take place at Grosvenor House, London, W.1. on 28th January next. Tickets (available to members only for themselves and guests) are obtainable from Mr. Penwill at 35s each (excluding wine).

Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £157 0s 0d
COPPER, H.C. Electro	ton £285 0s 0d
Fire Refined 99·70 per cent ..	ton £282 10s 0d
Fire Refined 99·50 per cent ..	ton £271 0s 0d
COPPER Tubes	lb 2s $8\frac{3}{4}$d
Sheet	ton £339 0s 0d
H.C. wire and strip	ton £317 15s 0d
LEAD, English	ton £91 10s 0d
Foreign	ton £90 0s 0d
MERCURY	flask £65 0s 0d
TIN	ton £986 0s 0d
ZINC, G.O.B. Foreign	ton £118 0s 0d
Electrolytic	ton £122 0s 0d
BRASS Tubes	lb 2s 3d
Sheet	lb 2s $5\frac{7}{8}$d
Wire	lb 2s $8\frac{7}{8}$d
PHOSPHOR BRONZE	
Wire	lb 1s $1\frac{1}{4}$d
RUBBER, No. 1 R.S.S. spot ..	lb $21\frac{1}{4}$–$21\frac{3}{4}$d

Hack Saw Standardization

On 1st January next an agreement will come into operation between the British Hacksaw Makers' Association and the Hacksaw Manufacturers' Association of America, Inc., which provides for the standardization of hack saw blades, and provides in particular that the American, British and Canadian hack saw industries will have a common list of hack saw blade sizes.

"Safe Driving" Competition

Last year 328 Yorkshire Electricity Board drivers out of the 398 who entered gained awards from the Royal Society for the Prevention of Accidents in the annual Safe Driving Competition. This year 424 drivers entered and 356 were successful.

Engineers' Guild

A special meeting of the West Midland Branch of the Engineers' Guild, held at the Digbeth Institute on 14th October under the chairmanship of Mr. F. R. G. Webb, was

addressed by Mr. R. Chalmers, the first president of the Guild and by Mr. Henry Nimmo, chairman of the Southern Electricity Board, who has just succeeded to the presidency. Mr. Chalmers reviewed the ideas which led to the formation of the Guild in 1938, as an association of chartered civil, mechanical and electrical engineers, and appealed for still greater support from the profession. Mr. Nimmo supported the appeal.

E.P.E.A. Dinner

The annual dinner of the Electrical Power Engineers' Association will be held on 28th November at the Connaught Rooms, Great Queen Street, London, W.C.1. Tickets (£1 5s for members and £1 17s 6d for non-members) can be obtained from Mr. F. H. Smethurst, hon. secretary, South Eastern Divisional Office, 118, New Kent Road, London, S.E.1. Members can obtain tickets for one lady at £1 5s, but extra tickets will be at £1 17s 6d.

Post Office Engineers' Overtime Rates

Post Office engineers are to receive higher maximum rates for overtime and Sunday duty. The maximum of 5s 10d is to be replaced by a maximum of 6s for time-and-a-quarter, 7s 3d for time-and-a-half, and 9s 7d for double time. Women are to receive a maximum of 4s 10d for time-and-a-quarter, 5s 9d for time-and-a-half, and 7s 8d for double time. The agreement applies to staff working a 44-hour week, and is back-dated to 1st May. The Post Office Engineering Union has not abandoned its right to raise again at a later date the question of the policy of the over-riding maxima system of payments.

Iron and Steel Prices

The Iron & Steel Prices (No. 3) Order, 1952, which came into force on 13th October increases the maximum price of certain types of pig iron and reduces the maximum price of certain steel tubes.

Foremen's Courses

A series of residential courses (the first from 15th to 17th November) has been arranged by the Institute of Industrial Supervisors, Bank Chambers, 47, Temple Row, Birmingham, for foremen and supervisors. Particulars can be obtained from the secretary.

Trade Announcements

W. Edwards & Co. (London), Ltd., have opened a new establishment at 44, West George Street, Glasgow, where they now have facilities for technical sales and service of high vacuum applications in Scotland.

The London office of **Line Equipment, Ltd.,** is now at 32, Queen Victoria Street, E.C.4 (telephone : City 1841/1842).

Truvox, Ltd., has appointed Mr. W. Waterston, 13, Charles Street, Dundee, as its agent for Truvox appliances, and Rola-Celestion loudspeakers for sale to the wholesale trade. Mr. Waterston will cover that part of Scotland including Stirlingshire northwards.

Kerry's (Great Britain), Ltd., has appointed Mr. Jack Dunham as radio and electrical representative for the Essex territory. Mr. Dunham was previously on the sales staff of Ekco-Ensign Electric, Ltd.

H. W. Carter & James, Ltd., Balsall Heath Wireworks, Wenman Street, Birmingham, 12, announce the setting-up of a new section to deal with safety guards for electric fires and other heating appliances.

Tullis Russell & Co., Ltd., have acquired new premises, which were opened on Monday last, at Ivorex House, Upper Thames Street, London, E.C. The telephone number is unchanged.

To provide full service facilities for users of its very high frequency mobile radio equipment, **Marconi's Wireless Telegraph Co., Ltd.,** has opened a new depot at 82-86, Belsize Lane, Hampstead, London, N.W.3 (telephone : Hampstead 4114), in the charge of Mr. J. C. R. Gardner.

Catalogues and Lists

British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk Street, London, W.C.2.—Illustrated folder dealing with "Glasef" (P.T.F.E.) aircraft wiring cables (319).

Allen & Pope, Ltd., 14, Shacklewell Lane, Dalston, London, E.8.—Broadsheet illustrating ranges of lighting fittings, wall brackets, floor standards, etc.

The Visco Engineering Co., Ltd., Stafford Road, Croydon, Surrey.—"Visco Water Cooling"—an illustrated booklet giving examples of water cooling applied to industrial uses, together with meteorological information and several useful tables.

Beesantee Illuminations (London), Ltd., 69, Upper Street, Islington, London, N.1.—Priced catalogue depicting a wide range of animated lighting fittings together with a special Coronation supplement.

Partridge, Wilson & Co., Ltd., Davenset Electrical Works, Leicester.—Priced leaflets illustrating the "Davenset" battery chargers, electric fencer energizers and inspection handlamps.

Ekco-Ensign Electric, Ltd., 45, Essex Street, Strand, London, W.C.2.—Four-page priced folder illustrating a range of "Ekco" flameproof lanterns, well-glass lanterns, rubber type handlamps and Coronation floodlights.

AUSTRALIAN NOTES

From Our Correspondent

THE Federal Government has refused to make available $10 million to the Government of New South Wales for the purchase of 75,000 kW of generating plant from the United States for the State electricity supply system. The Prime Minister (Mr. Menzies) has told the Premier of New South Wales (Mr. McGirr) that the Commonwealth is not satisfied that the plant would be received sufficiently earlier, if any earlier, from the United States than from Britain to justify so large a dollar expenditure.

Victoria's largest generating set (38,000 kW) broke down nine days after it was officially switched on by the Minister for Electrical Undertakings (Mr. Dodgshun). A ventilating fan in the generator section flew to pieces and damaged a part of the windings. Repairs will be made free of charge by the Swiss manufacturers Brown Boveri, who will send to Australia by air two armature-winding specialists. It is expected that the set will be out of action for up to three months.

Financial Problem

Private firms which have supplied the Victorian State Electricity Commission with millions of pounds worth of equipment have been told that the Commission cannot pay. It is understood that some 16,000 accounts are outstanding and the Commission is about £6 million short of the amount needed to settle them in full. In an effort to extricate itself from its financial predicament, the Commission has asked the suppliers to accept partial payment, and in some cases to take back equipment supplied. It has offered to meet the rest of its debts over a three-year period with interest at 5 per cent. The Commission's latest loan (£2 million at 4½ per cent) was oversubscribed by some £375,000.

The Western Australian Electricity Commission states that it also would find difficulty in meeting claims if immediate payment was required by local authorities for their electricity undertakings which had been compulsorily acquired by the Commission. The Federal Loan Council has granted permission to the Commission to float a loan of £1 million—the first loan of its kind in Western Australia.

Workers recently dismissed from the White Bay power house, Sydney, have decided to stay on the premises each day until reinstated. The New South Wales Government states that it had to dismiss the men because of a lack of funds.

An Australian manufacturer of radio equipment reports success for his company's products in the New Zealand market. "Against extremely strong competition from United Kingdom manufacturers," he says, "our firm was successful in obtaining an order totalling £32,745 for components for radio receivers for the N.Z. Department of Air."

World Bank Loan

A Bill has been introduced in the Federal Parliament, setting out in detail the types of projects on which a $50 million loan from the World Bank may be spent. Under the electric power programme there is the following:—Development and expansion of the electricity generating, transmission and distribution facilities of the principal suppliers of electricity in the territories of the borrower.

The principal power stations to be erected or extended, and the additional generating capacity to be installed in them are as follows: N.S.W.—Balmain, Pyrmont, White Bay and Bunnerong, 309,000 kW; Lake Macquarie, 175,000 kW; Wallerawang, 90,000 kW; and Tallawarra, 120,000 kW. Victoria—Yallourn "C," 106,000 kW; Yallourn "D," 100,000 kW; Newport, 40,000 kW; Spencer Street, 52,000 kW; and Kiewa No. 4, 60,000 kW. Queensland—Tennyson and Bulimba "B", 150,000 kW; Howard (Wide Bay), 15,000 kW; Rockhampton, 22,500 kW; Townsville, 22,500 kW; and Tully, 36,000 kW. South Australia—Osborne "B," 90,000 kW; Port Augusta, 90,000 kW. Western Australia—South Fremantle, 50,000 kW. Tasmania—Tungatinah, 125,000 kW; Trevallyn, 72,000 kW; and Wayatinah, 92,000 kW.

ELECTRICITY IN THE AREAS

Tests on "Live" Cables: Unseasonal Load Shedding

LONDON

UNDER the heading of technical developments the report of the London Electricity Board for the past year refers to tests carried out with a cartridge-fired spiking gun on a "live" 22 kV cable. The tests—believed to be the first of their kind in this country on such cables—proved the successful operation of the gun. They also provided an opportunity to measure quantitatively the effects on the operation of the Board's system and on neighbouring Post Office communication circuits. Other investigations concerned thermal effects on cables grouped in ducts and when in proximity to other cables and district heating installations. The five miles of 33 kV aluminium-sheathed impregnated gas-pressure cable between Ilford and Buckhurst Hill commissioned during the year gave satisfactory service.

Delays beyond the Board's control led to the expenditure on capital works being some 10 per cent lower than had been planned, but towards the end of the year the position had eased and the transmission construction programme again gathered momentum. On being advised that its allocation for the year would be only £5,272,000 (against estimated requirements of £7,827,417) the Board made representations to the Central Authority pointing out that this would leave nothing for new supplies, and subsequently the amount was raised to £6,720,000. By the end of the Board's fourth year the aggregate expenditure authorized on capital works was £25,292,435, of which £18,000,000 had been spent.

In a number of districts the older l.v. distribution systems have proved quite inadequate to meet the growing requirements of consumers. In Barnes, Finsbury, Hampstead, Islington and Southwark the capital cost of reconstructing the distribution systems was estimated at £3,500,000, covering work to be carried out in 8–10 years, with a further £1,000,000 on changing consumers' apparatus.

The maximum demand on the Central Authority's system was computed to have occurred at 5 p.m. on Monday, 28th January, being estimated at 1,433,280 kW. Load to the extent of 77,480 kW was then being shed, making the maximum simultaneous requirement 1,510,760 kW. No power cuts were imposed last winter but there were reductions in voltage on 82 occasions, nearly half of them in April and May, 1951; the greatest amount of load shed was, in fact, 240,710 kW on 30th April.

The commercial section of the report records various tariff changes during the year. The turnover from contracting work and the sale of apparatus increased by £419,000, but the volume of sales of certain types of domestic apparatus declined as a result of increased purchase tax. Further progress was made in the extension of public lighting by electricity, 3,786 additional fittings being connected. Installations carried out by the Board included the lighting of Parliament Square, Westminster.

SOUTH EASTERN

The fact that more electricity was sold to more consumers by fewer employees is underlined by Mr. Norman Elliott, the chairman, in his foreword to the report of the South Eastern Board. Actually, more than 27,000 new consumers were connected and an additional 259 million kWh was sold, while staff was reduced by 165. Increased efficiency of the Board's organization has been achieved by further amalgamations of districts, reducing the number to 31 (against 55 when the Board was established). On the resignation of the purchasing officer, the headquarters purchasing organization was rearranged by giving the chief officers responsibility for purchasing within their respective spheres.

Although the Board reduced its working costs per kWh sold from 0·598d to 0·582d, an increase in the cost of electricity bought in bulk from the British Electricity Authority—due mainly to higher coal cost—was more than enough to offset these economies. Purchase of electricity from

the B.E.A. took two-thirds of the Board's gross income. The coal price structure, in the Board's opinion, should be revised, because prices for low-grade coal used in generation are disproportionately high. The South Eastern Electricity Consultative Council, in its report, says that it has urged the Minister of Fuel and Power to set up a Consumers' Council to watch over generating costs; under the Electricity Act, 1947, Consultative Councils are restricted to exercising vigil over distribution only.

The report looks back over the four years since vesting day and gives aggregate figures showing how expenditure has been closely matched by income. Revenue expenditure in that time has been £59,052,617, as compared with an aggregate income of £59,744,512, showing a surplus of £691,895, or 1·2 per cent of turnover. Out of this surplus the Board has contributed £286,000 to the B.E.A.'s central reserve fund and has set up a taxation reserve of £342,000. The net revenue surplus carried forward is £13,895, with a reserve of £50,000. Last year, for the first time, there was a loss of £97,074 on the year's working. To keep prices down, the Board says, it must be able to influence economic development of load which is threatened by restrictions on publicity.

The National Farmers' Union has expressed appreciation of the Board's rural development policy. Nationally-important in increasing food production, agriculture is one of the principal industries of South Eastern England; 473 farms were connected in the year and two-thirds of the 13,000 farms now have a supply compared with a national average of two-fifths.

Major extension and reinforcement schemes in progress at the end of the year included the following:—33 kV substation associated with new 132 kV bulk supply point at Worthing, £175,000; Beddington–Purley, 33 kV, £134,000; Orpington–Sundridge, 33 kV, £128,000; 33 kV reinforcement, Betteshanger and Snowdown Collieries, £88,000; uprating equipment, Tunbridge Wells power station, £67,000; 33 kV substation, Three Bridges, for Crawley New Town, £63,000. Total capital expenditure was £2,900,000 against the £2,707,000 allocated.

Power cuts numbered 22 against 72 in the previous year, and 19 of them occurred in April and May, 1951, when extensive overhauling of plant coincided with unusually cold weather. The simultaneous maximum load was 714,385 kW, but the date of its occurrence is not stated; in the two preceding years the m.d. was recorded on a Sunday.

SOUTHERN

A reduction in the number of persons employed—of 135—is also reported by the Southern Electricity Board. The Board's general policy has been to keep its organizational methods and practices under constant review rather than to undertake periodical economy drives. During the year the arrangements for carrying out constructional work were reviewed and it was decided to place the responsibility for major schemes upon Sub-Area Construction Sections.

Of the total capital expenditure authorized during 1951–52, amounting to £3,940,000, approximately £3,770,000 was in respect of engineering work. These included the provision of 33 kV systems in Salisbury (£67,000) and Winchester (£48,000); 33 kV system extensions in Oxford (£62,000), north of Swindon (£47,000) and east of Southampton (£67,000); reinforcement of the 11 kV system in the centre of Bournemouth (£64,000) and extension of the 22 kV system in Slough (£184,000).

Because of shortages of lead and copper, trial lengths of aluminium sheathed cable were installed and three low voltage overhead distribution schemes employing aluminium conductors are being constructed.

A supply was made available for the first time to 49 villages and hamlets, and 1,297 farms were connected during the year.

A standard two-step block tariff, based on the number of rooms, was applied to all domestic consumers as from the first meter reading after 1st October, 1951. This tariff was estimated to produce the same revenue as the 125 domestic tariffs which it replaced. Work on the standardization of commercial and farming tariffs is in hand.

Load shedding by interruption of supplies was much less than in previous years; there were only 13 occasions during the year when any part of the Board's area was affected. The simultaneous maximum demand of 839,018 kW occurred at 8.30 a.m. on Friday, 1st February.

During the year 167 appliances were tested and of these 47 were modified by manufacturers as the result of suggestions made by the Board.

ELECTRICITY SUPPLY

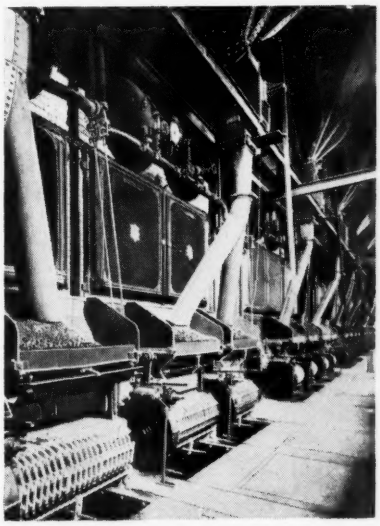
Manchester's Long-Service Boilers

Rationing in Ireland

AFTER a working life of more than half a century, eight out of eleven Babcock & Wilcox boilers installed in 1901 in the Bloom Street generating station of Manchester Corporation are still able to carry load. Originally serving reciprocating engines, they steamed a 10 MW turbine set from 1917 up to early 1952. This machine having been scrapped, the boilers are now used for the district heating service which has been a feature of this station for more than forty years.

Six of the boilers were modified in 1918 (after the turbine was commissioned) to increase the superheat; the grate was lengthened from 8ft 6in to 10ft and the superheating surface increased to 880 sq ft. Since then some of the grates have been modified to utilize the modern Style 6 link, which is shorter and thinner than the original design. All the driving mechanisms are still operating satisfactorily. Tests in 1925 showed an efficiency of 71·4 per cent for the boiler alone and 76·59 per cent for boiler and economizer; the latter, incidentally, were scrapped in 1944.

View of the firing aisle of Bloom Street station as it was in 1901



In spite of the fact that they have operated for much of their working life on Manchester tap-water dosed with a little caustic, the three boilers which succumbed did so from external, not internal, corrosion. Unlike the modern header boiler whose internal covers tend to tighten under pressure, these boilers are fitted with the old-style external caps which steam pressure tends to lift. At some period or other in their long history a weep was allowed to develop, causing corrosion of the mud box which prevented their annual certification.

The future of Bloom Street station, now vested in the North Western Division, has not yet been officially announced, but the remaining eight boilers must be allowed to survive a few more years to fulfil long-term contracts for heating steam while final decisions are being made regarding the possibility of installing modern plant for district heating.

Wind Power Investigations

A public inquiry was opened recently at Caernarvon into an application by the British Electricity Authority for confirmation of a compulsory purchase order on part of Mynydd Annelwog, a local beauty spot, for the erection of an experimental wind driven generator. The inquiry was adjourned following a protest on behalf of the objectors that the Ministry of Fuel and Power had not provided an interpreter for witnesses who wanted to give their evidence in Welsh.

Reinforcement Schemes

The South West Scotland Electricity Board has approved a scheme, estimated to cost £157,000, for reinforcing the network in Ayrshire, north of Kilmarnock. At present this area is supplied from a double circuit "K" pole 22 kV overhead line which is tapped at a number of points between Kilmarnock and Kilbirnie. This line is becoming overloaded and the demand for electricity in the area is still increasing. A new 33 kV overhead line will be constructed between Kilmarnock and Kilbirnie, a distance of some 14 miles, and the existing 22 kV line will then be used as a single feeder until it is replaced by a second 33 kV line, which it is intended to construct at a later date. In addition, a 33/11 kV outdoor substation will be constructed at Kilbirnie.

The Board has also approved a £10,302

scheme for reinforcing the electricity network in the southern part of the burgh of Dumfries. This will not only relieve the present overloading on that network but will enable the Board to meet the increasing demand in the area. As part of the scheme, three existing 3·3 kV substations will be transferred to the 11 kV system and a new substation, at present under construction, will be equipped and energized at 11 kV.

Foss Islands Extensions

York City Council is recommended to approve extensions to the Foss Islands generating station. The scheme, which was discussed recently by representatives of the British Electricity Authority, the Yorkshire Ouse Rivers Board, the Ouse and Foss Navigation Committee and the York Streets and Buildings Committee, relates mainly to the replacement of plant destroyed in the explosion in 1949.

Higher Charges Foreshadowed

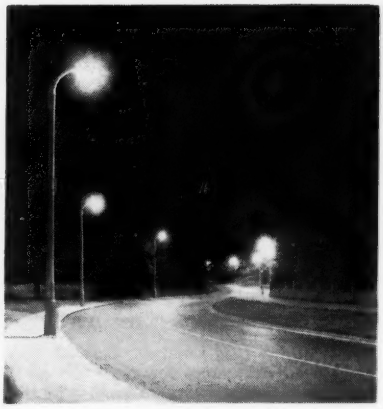
A forecast of an increase in electricity charges consequent upon a loss during the past financial year was made by Mr. H. H. Mullens, chairman of the North Eastern Electricity Board, at a Newcastle-on-Tyne Press conference. Mr. Mullens said he did not know what the new rates would be, and he did not think they would be announced until the present financial year ended. Dealing with a reference in the Board's annual report to a disappointing fall in demand especially last winter, Mr. Mullens stressed that the Board wanted to sell as much electricity as possible outside peak hours.

Rate Relief Contributions

At a recent meeting of Guildford Town Council it was reported that the British Electricity Authority would not agree to settle its claim against the Corporation with regard to a sum of about £10,000 transferred to rate relief from the profits of the former electricity undertaking in the three years before nationalization, and proposed that the claim should be referred to the Minister of Housing and Local Government for determination. The Town Clerk is to obtain Counsel's opinion in the case.

Street Lighting

At BALDOCK, on the Great North Road, traffic has to negotiate two right-angle turns in its passage through the town. Until this year the only lighting on this section of the road was a total of 31 gas lamps mostly with two-light No. 2 burners, on short cast iron columns widely spaced apart. Recently a new installation was brought into commission comprising a total of 70 points of 140 W sodium lamp lighting. The standard of lighting has been improved several fold but the total annual cost to the ratepayers is only about twice that of the old gas installation of less than half the number of lamps. All material was supplied, and the erection work



The Baldock section of the Great North Road lit by Crompton sodium lamps

carried out, by Crompton Parkinson, Ltd. Crompton "Corona" II lanterns were used throughout and the columns selected were the "Avenue 3D" and "3DN" designs of Concrete Utilities, Ltd., with "ARC II" brackets.

After seven years' planning, electric street lighting is being installed at ASHBOURNE, Derbyshire.

Subject to the approval of the Ministry of Transport, STOURBRIDGE Town Council proposes to extend the electric street lighting along the main road from Stourbridge to Lye Cross and along High Street, Lye, to the Hayes. The scheme will cost nearly £4,000.

JARROW Town Council has approved a revised estimate by the borough engineer for lighting Leam Lane. The cost will be £5,375, an increase of £475.

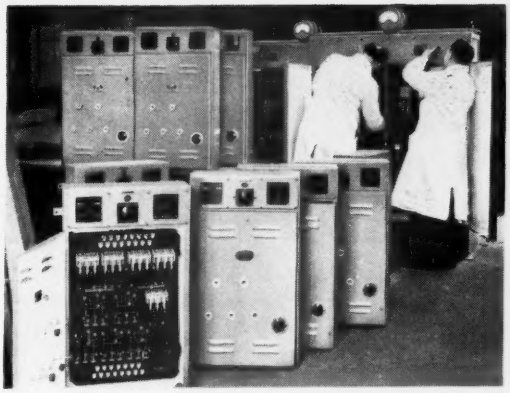
Electricity Rationed in Ireland

On Monday, rationing of electricity began throughout the Irish Republic. This step became necessary by the prolonged drought, which has reduced by about one half the normal flow of water to hydro-electric power stations at the various undertakings. The ration is being based on the average daily consumption in the comparable two months of 1950. Electricity for cooking has been cut by 10 per cent and for other purposes, including heating, by 25 per cent. Every effort is being made by the Electricity Supply Board to substitute turf for coal for generating electricity.

Clady River Scheme

The plans for hydro-electric development of the Clady, County Donegal, are now complete and will be carried out in due course. A power station near Gweedore will have a capacity of 4,000 kW.

SPECIAL CONTROL GEAR



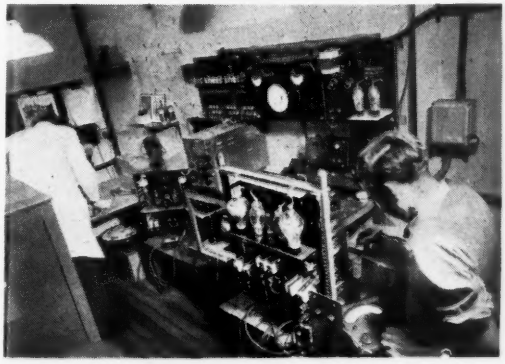
Automatic Equipment to Meet Requirements of Various Industries

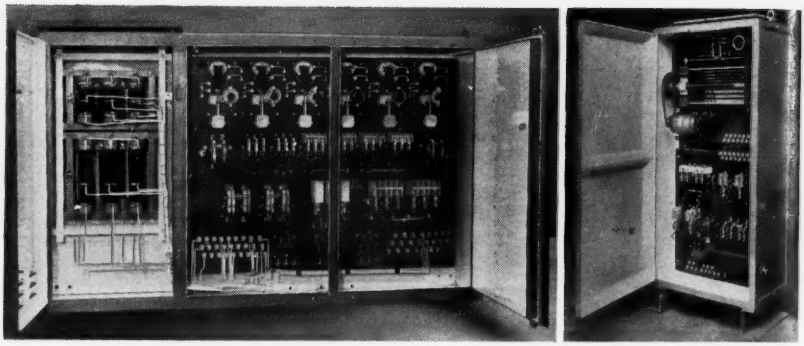
THE design and production of automatic control equipment to meet the particular requirements of various industries are not as a rule welcomed by electrical manufacturers. Since its inception in 1946, however, M.T.E. Control Gear, Ltd., has been primarily concerned with this class of business and has developed special facilities for dealing with it.

In the early days, the machine tool industry absorbed most of the company's output but it was found that as the magnetically operated airbreak contactors and relays produced formed the basis of such a wide variety of control panels, activities were gradually extended to other industries. For this reason the name of the company was changed from Machine Tool Electrics, Ltd., to its present name in 1950.

With nearly 200 employees, the company now produces special control equipment for almost every industry utilizing electric and hydraulic power and supplies equipment for air compressors, air conditioning plant, blast furnaces, conveyors, cranes, food machinery, foundries, hoists, hydraulic machinery, laundry machinery, mechanical handling equipment, machine tools, paper mills, power station auxiliaries, printing machinery, pumps, refrigeration plant, ships, skip hoists, textile machinery, wire-drawing machines and woodworking machines. Most of the equipment consists of multi-motor control panels covering a sequence of operations sometimes with mimic diagrams, as in the case of materials handling plant, where visual flow indication is provided. In some cases, particularly for variable-speed drive of machine tools, electronic control methods are employed. Considerable progress has also been made in the application of d.c. injection braking. The company's most recent development has been in the field of voltage stabilizers employing

Above: **A batch of specially-designed control panels undergoing final inspection before despatch. Those in front are for fruit storage plants.** *Below:* **Test section for electronic control equipment**





Left: **A four-motor crane control panel, incorporating automatic stator-rotor starting for the main 45 h.p. motors** *Right:* **D.c. control panel with crosshead regulator for a printing press**

transductors to give specially quick response.

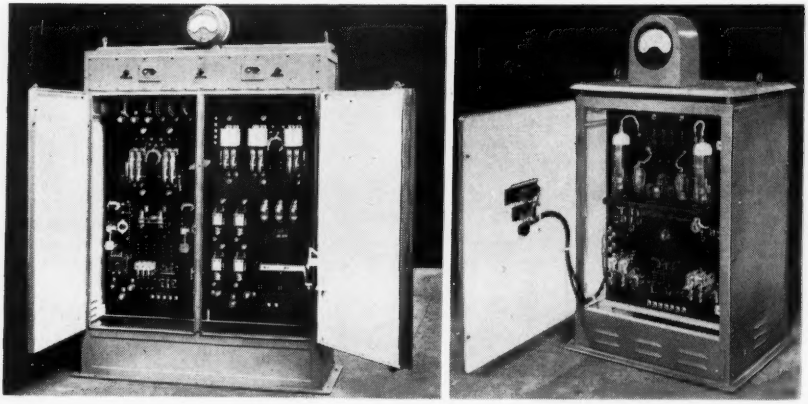
While the company is still devoting about 80 to 85 per cent of its resources to the development of schemes and equipment for special needs of industry which cannot be met by standard products, a complete range of standard starters including oil immersed star-delta starters has nevertheless been developed for motors up to approximately 100 h.p.

In all cases equipment is developed in close collaboration with the manufacturers of the machinery it controls. Particular attention is paid to terminal layout and ample space is provided for wiring.

Production at the company's main works in London Road, Leigh-on-Sea, is therefore devoted largely to producing " tailor made " control gear, a smaller factory at Pitsea being mainly employed on the production of the more standard types of starters and switchgear. The manufacturing resources of the company are practically self-contained. The machine shop, sub-assembly, panel assembly and final assembly shops are disposed conveniently in relation to the centrally situated stores and the machine shop is equipped with the latest type of machine tools. Sheet metal shops produce sheet steel cabinets and facilities for tool making are available.

A very large proportion of the output goes abroad and the company has agents in a number of overseas countries.

Left: **80 h.p. stator-rotor starter for a special heavy duty lathe.** *Right:* **Electronic variable speed control equipment for a large paper mill**



PROMISING TURKISH MARKET

German Recovery of Trade

THE 1951 returns of Turkey's electrical imports show a substantial increase in value on the previous year, notably in communication equipment, electro-medical and X-ray apparatus, motors, dynamos, etc., under 50 kg in weight, and vacuum cleaners. While imports of batteries more than doubled in value, those of accumulators declined somewhat: large capacity power plant also fell off. Values of some of the leading groups, with notes of increases or decreases compared with 1950, are given in the accompanying table. It will be seen that Western Germany has been steadily regaining former business in many lines.

Turkish economic progress generally gives promise of growing demands for electrical apparatus: the meta and textile industries in particular have been making big strides. Electricity supply has been extending and various power plants, both thermal and hydro, are approaching completion. That at Catalagzi is planned to feed widely outlying districts. By 1955 it is expected that the Sariyar station will be ready to supply 80,000 kW initially; subsequently the output of the power station will be increased by 50 per cent and it will form the basis of a grid which will supply Istanbul and Ankara.

A law to encourage foreign investment in Turkey guarantees the repatriation of capital and profits. The average rate of exchange in 1951 for the Turkish lira was 7·875 to the £.

IMPORTS OF ELECTRICAL EQUIPMENT

Class of Goods	1951 Lira (000)	Inc. or dec. on 1950 Lira (000)
Motors, dynamos, magnetos, etc., up to 10 kg	491	+ 212
From W. Germany	124	+ 44
,, *Switzerland*	3	+ 1
,, *United Kingdom*	196	+ 123
,, *Belgium*	2	+ 1
,, *United States*	62	+ 31
Motors, dynamos, magnetos, etc., 10–50 kg	1,198	+ 549
From W. Germany	437	+ 266
,, *United Kingdom*	314	+ 224
,, *Switzerland*	161	+ 59
,, *Belgium*	86	+ 79
Ditto, 50–1,000 kg	2,464	— 362
From W. Germany	1,192	+ 445
,, *United Kingdom*	346	— 103
,, *Switzerland*	116	— 42
,, *Belgium*	181	+ 166
,, *United States*	215	— 839
Ditto, 1,000–5,000 kg	1,610	— 323
From W. Germany	1,008	+ 648
,, *United Kingdom*	276	— 129
,, *Switzerland*	32	+ 32
,, *Belgium*	10	+ 5
,, *United States*	79	— 398
Ditto, over 5,000 kg	1,189	— 337
From W. Germany	767	+ 142
Transformers, resistances, etc.	2,713	+ 752
From W. Germany	981	+ 527
,, *Belgium*	266	+ 220
,, *Holland*	247	+ 54
,, *United Kingdom*	170	+ 135
,, *United States*	555	159
Vacuum cleaners, etc. (including electric)	757	+ 606
From United Kingdom	286	+ 247
,, *W. Germany*	208	+ 178
,, *Holland*	130	+ 80
Telegraph equipment and parts	25	— 21
From W. Germany	11	11
,, *United Kingdom*	7	14
Telephone equipment and parts	3,039	+ 1,399
From W. Germany	740	+ 357
,, *Sweden*	1,793	+ 1,051
,, *Belgium*	167	+ 120
Radio transmitters (telegraph) and parts	49	+ 10
From United States	38	+ 18
,, *Belgium*	11	+ 11
Radio receivers (telegraph) and parts	64	+ 7
From United States	60	+ 56
Radio transmitters (telephone) and parts	246	— 332
From United Kingdom	240	+ 238
Radio receivers (telephone)	20,930	+ 9,879
From W. Germany	6,256	+ 4,730
,, *Holland*	5,577	+ 3,007
,, *Denmark*	1,964	+ 318
,, *France*	1,696	+ 616
,, *United Kingdom*	1,423	+ 1,220
,, *Sweden*	966	— 207
Radio parts	2,292	+ 451
From Holland	682	+ 472
,, *United States*	618	— 609
Electro-medical apparatus and parts	672	+ 342
From W. Germany	285	+ 187
,, *United Kingdom*	48	+ 1
,, *France*	83	+ 63
,, *Holland*	80	+ 54
,, *Switzerland*	66	+ 56
X-ray apparatus	1,144	+ 290
From W. Germany	449	+ 184
,, *Holland*	278	+ 24
,, *United Kingdom*	220	+ 161
X-ray accessories	876	+ 517
From United Kingdom	255	+ 99
,, *Belgium*	158	+ 73
,, *United States*	248	+ 179
Accumulators and parts	1,812	— 148
From W. Germany	980	+ 168
,, *United Kingdom*	322	+ 133
,, *Sweden*	193	+ 94
,, *United States*	152	— 436
Batteries	3,622	+ 1,988
From W. Germany	1,070	+ 923
,, *United Kingdom*	2,176	+ 1,750

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

Reports and Dividends

Newton Brothers (Derby), Ltd.—The annual meeting was held on 6th October. In his circulated statement, Mr. F. V. Pipe (chairman) said that the reduction in trading profits on an increased production was due to advances in the costs of material and labour operating against firm price contracts. Export orders amounted to 17 per cent of the total production. Their outstanding order book at 31st March last was the highest since 1946 and was now higher still.

W. H. Allen, Sons & Co., Ltd.—A scrip bonus issue and conversion into a public company are proposed. Subject to the proposals being approved by shareholders, it is intended towards the end of this month to apply to the Council of the London Stock Exchange for permission to deal in and for a quotation for its shares.

McMichael Radio, Ltd., proposes to increase its borrowing powers from the present limit of the nominal share capital (£250,000) to a maximum of twice the issued capital (£484,728) at any one time. Since the presentation of the last accounts, the directors have been able to increase substantially the contract work for Government Departments, mainly in connection with their defence programmes. In order to carry out this expansion of business it may be necessary to borrow, temporarily, sums in excess of the present limit.

Switchgear & Cowans, Ltd., proposes to increase its capital to £250,000 by the creation of a further 400,000 5s ordinary shares. Subject to the consent of the Capital Issues Committee, 100,000 of the new shares will be offered to shareholders as a "rights" issue in the proportion of one new share for each six held at a price to be fixed nearer the time of the issue.

The Electrolytic Zinc Co. of Australia, Ltd., has announced a final dividend of 30 per cent on both 8 per cent participating preference and ordinary, making 45 per cent for the year to 30th June last. For the previous year the total distribution was 35 per cent.

Broadcast Relay Service, Ltd., has declared an interim dividend of 8 per cent, tax free (unchanged).

At an extraordinary meeting held on 8th October, resolutions were passed increasing the capital to £3,200,000 by creating 2,000,000 5s ordinary shares and raising the directors' borrowing powers.

Lightalloys, Ltd., reports a net profit for the year to 29th June last, after charging depreciation (£10,311) and taxation (£44,350), of £25,138, as compared with £17,043 for the preceding year. It is proposed to pay a final dividend of 9d per share, making 1s per share for the year (unchanged). The balance carried forward is £12,358 (against £4,445 brought in).

New Companies

F. W. Cole & Sons (Manchester), Ltd.—Registered 19th September. Capital £2,000. To acquire the business of F. W. Cole & Sons carried on by F. W. Cole at Moston, Manchester, and to carry on the business of electrical engineers, etc. Directors: F. W. Cole, C. S. Neal and Mrs. Alice L. Neal. Solicitors: Moss & Haselhurst, Northwich, Ches.

W. J. Taylor (Domestic Supplies), Ltd.—Registered 23rd September. Capital £1,000. Manufacturers and dealers in television, wireless, gramophone and radio gramophone sets, vacuum cleaners, washing machines, refrigerators, electric stoves and ovens, etc. Subscribers: Dorothy M. Chester and A. F. Pritchett. Solicitors: Duggan, Elton & James, Birmingham.

Irish Cables, Ltd.—Registered in Belfast 22nd September. Capital £100,000. Electrical, mechanical and general engineers and contractors, manufacturers of cables, wires, etc. Directors: Geoffrey F. Falk, W. L. Wray, H. W. Coles, W. M. F. Thuner and G. W. Edge. Regd. office: Castlewellan Road, Newcastle, Co. Down.

Magnetics (London), Ltd.—Registered 27th September. Capital £3,000. To enter into an agreement with S. I. Hitchcock, and to acquire interests in any patents, brevets d'invention, licences, concessions and the like, and to carry on the business of manufacturers and repairers of and dealers in dynamos, motors, armatures, magnetos, batteries, etc. The first directors are not named. Solicitors:

Markby, Stewart & Wadesons, 5, Bishopsgate, E.C.2.

Cannon Electric (Great Britain), Ltd.—Registered 1st October. Capital £100. Buyers, sellers, importers, exporters and dealers in electric connectors and terminals, electric receptacles, solenoids, wiring devices and all kinds of electric and electronic equipment, etc. Directors: D. Forrester and R. Cannon. Solicitors: Kenneth Brown, Baker, Baker, Essex House, Essex Street, W.C.2.

Hatfield Instruments, Ltd.—Registered 1st October. Capital £500. Manufacturers, dealers, repairers and hirers of electrical, optical and mechanical apparatus and accessories and components of all kinds, in particular electrical, optical, mechanical and radio measuring instruments, etc. Directors: R. H. Hatfield (life managing director and chairman), Mrs. E. V. Hatfield and T. K. Phelan. Secretary, R. H. Hatfield. Regd. office: 175, Uxbridge Road, Hanwell, W.7.

W. & N. Electronics, Ltd.—Registered 25th September. Capital £5,000. Directors: H. V. Davies and G. F. Hoptroff, directors of W. & N. Engineering Co., Ltd., etc. Secretary: Ronald Shuffleton. Regd. office: 80/82, Uxbridge Road, W.5.

Brandon Electrical Sales, Ltd.—Registered 25th September. Capital £1,000. Directors: H. Solomon and Mrs. M. Solomon, directors of Brandon Electrical Engineering Co. (Leeds), Ltd. Secretary: Mrs. M. Solomon. Regd. office: Leathley Road, Hunslet, Leeds.

Selex Electric Co. (Kirkby), Ltd.—Registered 1st October. Capital £10,000. To acquire the business of electrical engineers carried on by E. G. Sellers, H. J. McMath and L. Bowen, as Selex Electric Co., at Kirkby Trading Estate, Whiston, Lancs. The first directors are not named. Solicitors: Hill Dickinson & Co., 10, Water Street, Liverpool, 2.

Rodway Jones & Co., Ltd.—Registered 8th October. Capital £3,000. To acquire the business of manufacturers and dealers in electrical water and other heaters, now carried on by F. G. Jones and Mrs. J. M. R. Rodway as "Rodway Jones & Co.," at 36, Station Road, Westcliff-on-Sea. Directors: F. G. Jones and H. T. Baldwin. Secretary: R. J. Eagle. Regd. office: Broadmead House, 21, Panton Street, S.W.1.

E.R.E.S., Ltd.—Registered 3rd October. Capital £750. Electricians, mechanical engineers and manufacturers of and dealers in electrical apparatus and goods, etc. Directors: A. L. George, S. J. George and R. B. Webb, 1, Ravenswood Road, E.17. Regd. office: 64/82, Higham Street, Walthamstow, E.17.

Increases of Capital

General Electric Co., Ltd.—Increased by £12,000,000, in £1 ordinary shares, beyond the registered capital of £11,600,000.

J. Sanger & Son, Ltd.—Increased by £5,000, in £1 ordinary shares, beyond the registered capital of £15,000.

Rockweld, Ltd.—Increased by £28,000, in £1 ordinary shares, beyond the registered capital of £35,000.

Liquidation

B. & B. Scott, Ltd., electrical contractors.—Winding up voluntarily. Liquidator, Mr. B. Phillips, 76, New Cavendish Street, London, W.1, appointed 22nd September. Particulars of claims to the liquidator by 27th October.

Bankruptcies

A. Sheridan, lately trading in partnership with another as S. M. Disposals, 223, Richmond Road, Hackney, London, E.8, radio and electrical contractor.—Receiving order made 2nd October on a creditor's petition. First meeting 23rd October and public examination 5th December, both at Bankruptcy Buildings, Carey Street, London, W.C.2.

E. J. R. Tremlett, 941, Wimborne Road, Moordown, Bournemouth, radio and electrical dealer.—Receiving order made 3rd October on debtor's own petition.

H. E. Stacey, formerly carrying on business at 89, Northampton Road, Market Harborough, as a radio and electrical dealer.—Application for discharge to be heard on 5th November at The Castle, Leicester.

J. L. Parker, electrician, 15, West Street, Horncastle, Lincs.—First dividend of 15s in the £, payable on and after 14th October at the Official Receiver's office, 22, Regent Street, Park Row, Nottingham.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 8th November.

SPARCATRON. No. 708,116, Class 7. Electric alternators, generators, corroding machines, electric disintegrators, machine tools and tools for use therein, and parts included in Class 7 of all the aforesaid goods.—Sparcatron, Ltd., Abbey Yard, Bath.

No. B.706,581 (design), Class 9. Cinematograph films prepared for exhibition; radio, television and photographic instruments and apparatus; and electrical instruments and apparatus included in Class 9.—Conquest Productions, Ltd., 36, Dover Street, London, W.1.

ARVIN. No. 708,604, Class 9. Television receivers and parts thereof included in Class 9.—Arvin Industries, Inc., Columbus, Indiana, U.S.A. Address for service, c/o Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

WEFCO. No. 693,208, Class 11. Electric hand lamps and electric torches.—Watts, Fincham (1932), Ltd., 9, St. Helen's Place, London, E.C.3.

STOCKS and SHARES

WITH a reasonably firm lead from British Government securities, most sections of the Stock Exchange have tended to regain confidence. Favourable factors include the White Paper on the nation's balance of payments, with its disclosure of an overall balance achieved ahead of schedule, and the Chancellor's speech last week to the bankers. This latter gave rise to the impression that it is not at present in the Treasury's mind to issue any long-term loan to replace the unusually large volume of short-term borrowing in which the Exchequer is at present engaged. Effects of such an operation could scarcely fail to depress existing Government securities, and the possibility has been for some time a load overhanging the gilt-edged market.

Cable Shares

Cable manufacturing companies have proved to be among the most prominent in this year's new issue activity, several of the best-known firms, including Henley's, B.I.C.C., Telegraph Construction and Siemens Brothers, having raised substantial funds by the offer of ordinary shares by way of rights to existing holders. Issues by the first two of these companies involved, by themselves, a total in the neighbourhood of £5¼ million new money. After the disturbance caused by these operations, and a pause intermediately for consideration of the Monopolies Commission report, prices of the shares concerned have settled down, roughly, into their accustomed order. They retain their own niche among the more reliable and progressive fields of investment, and, although forming a relatively small group, they provide the investor with a usefully wide range for his selection, so far as yields are concerned.

Upwards of 5½ per cent

British Insulated Callender's Cable £1 shares are quoted, as usually, on the lowest yield basis in the cable manufacturing group. The return of 5¼ per cent, at the present price and dividend rate, is in line with that on the leaders in other sections of the industrial market. Henley's ordinary and Johnson & Phillips ordinary pay a fraction more, while on Telegraph Construction and Scottish Cables (allowing for the recent share bonus) prospective yields are around the 5¾ per cent mark. Siemens ordinary pay a trifle over 6 per cent on the money, which is the return on Reliance-Clifton at their present price, without taking into account the recent increase in the interim dividend. Enfields show a yield of six guineas per cent, Aberdare Cables seven guineas and Hackbridge Cable about 8¾ per cent. Returns of 10 per cent and over are obtainable from General Cables and Aerialite shares.

Switchgear & Cowans

Switchgear & Cowans 5s shares hardened to 14s 3d after news of the new capital proposals. Subject to official permission, the intention is to offer 100,000 new shares by way of rights to existing shareholders, in the proportion of one new for every six shares held. The price is to be fixed nearer the time of the issue. For the past two years the company has paid dividends of 20 per cent, with the addition of a cash bonus of 2½ per cent, the latest distribution being covered by earnings equivalent to about 44 per cent on the present capital of £150,000.

The Week's Changes

General Electrics are 1s better on the week at 40s 6d: selling of the bonus shares seems to have subsided, and the halving of the price, as a result of the 100 per cent share distribution, is thought to have widened their investment appeal. Associated Electrics at 72s 6d are also 1s to the good. Last week's news of the lifting of the ban on overtime working in the engineering industries was a helpful influence generally in the industrial market. Automatic Telephones have been in demand, and are 1s 3d better at 56s 3d. Babcock & Wilcox, with another advance of 2s, have reached a yield basis no higher than 5 per cent, an uncommon distinction by present standards. A rise of 1s 3d in Sturtevant reflects satisfaction with the previously declared interim dividend and share bonus. Among a number of others showing improvement in prices are Plessey, Revo, Parsons and Metal Industries.

New Issues

Broadcast Relay Service announced last July that steps were being taken with a view to raising some £2½ million in debenture stock and ordinary shares. The debenture stock, amounting to £1,888,000 in 5½ per cents at 100, and 1,000,000 ordinary shares of 5s each at 14s, are being offered this week. As stated earlier in the year, the new shares are to be issued as rights to the existing ordinary stockholders, in the proportion of one new share for every six 5s units held. The total gross proceeds of the new issues will be just over £2½ million. The present price of the old shares is about 23s.

McMichael Radio also propose to raise their borrowing powers, in connection with an increase in contract work for Government departments. All but 65,000 of the million new shares issued by Telephone Manufacturing were taken up by way of rights. Allotments to applicants for the "excess" shares not so subscribed were scaled down to lots of 50 to 300. With the new shares quoted at 8s 3d against the offered price of 5s 9d, the allotments were nevertheless well worth having.

ELECTRICAL INVESTMENTS

Past Week's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 13th Oct. 1952	Week's Rise or Fall	Est. Yield £ s d
Gilt-edged and Overseas Stocks					
Brit. Elec. 1968/73	3	3	83½	−½	5 11 10
Brit. Elec. 1974/77	3	3	82½	—	5 12 9
Brit. Elec. 1976/79	3½	3½	88½xd	—	5 19 4
Brit. Elec. 1974/79	—	4½	99½	+½	4 5 5
Calcutta Elec. ..	6†	6†	20/6	—	5 17 1†
East African Power	7	7	21/6	—	5 14 3
Nigerian Elec. ..	10	10	21/3	—	—
Palestine Elec."A"	5†	Nil	12/6	—	—
Perak Hydro-Elec.	Nil	Nil	13/9	—	Nil
Equipment and Manufacturing					
Aberdare Cables (5/-)	20	20	13/6	—	7 8 3
Aerialite (1/-) ..	83½	88½	8/3	—	10 14 2
Aron Elec. Ord. ..	15	15	33/9	—	8 17 9
Assoc. Elec. Ord..	20	20	72/6	+1/-	5 10 6
Automatic Tel. & El.	15	15	56/3	+1/16	5 6 8
Babcock & Wilcox	18	18	72/-	+2/-	5 0 0
Baldwin, H. J. (2/-)	25	25	4/3	—	11 15 4
Bakelite (10/-) ..	—	—	17/6	—	—
British Aluminium	10	12	43/9	+6d	5 9 7
B.I. Callender's ..	7½	9	32/6	—	5 10 9
British Thermostat (5/-)	30	30	27/-	—	5 11 1
British Vac. Cleaner (5/-)	25	25	13/-	—	9 12 4
Brook Motors (10/-)	20	20	28/9	—	6 19 2
Brush Ord. (5/-) ..	10	10	4/9	—	10 10 6
A. F. Bulgin (1/-)..	27½	30	2/6	—	12 0 0
Burco (5/-) ..	42½	38½	21/3	+6d	9 2 3
Chloride El. Storage	15	15	58/9	—	5 2 0
Cole, E. K. (5/-) ..	25	25*	15/9	−3d	7 18 9
Cossor, A. C. (5/-)	Nil	10	8/9	—	5 14 3
Crabtree (10/-) ..	17½	17½	34/-	—	5 3 0
Crompton Parkinson Ord. (5/-) ..	11¼	11½	9/-	—	6 5 0
De La Rue (5/-) ..	50	35*	10/6	+1/-	—
Decca (1/-) ..	112½	112½	18/6	+6d	6 1 6
Dewhurst (2/-) ..	35	22½*	4/6	+3d	—
Dictograph Tel.(2/-)	20	20	4/9	—	8 8 6
E.M.I. (10/-) ..	8	12	15/9	—	7 12 3
Electrical Components (5/-) ..	20	20	10/-	—	10 0 0
Elec. Construction	15	15	50/-	—	6 0 0
Enfield Cable Ord.	7½	7½	23/9	—	6 6 4
English Electric ..	15	15	55/6	—	5 8 1
Ericsson Tel. (5/-)	22†	22*†	39/6	—	2 15 8†
Ever Ready (5/-)	35	35	26/-	+6d	6 14 6
Falk Stadelmann	15	15	38/-	—	7 17 10
G.E.C. Ord. ..	17½	22½	40/6	+1/-	5 11 1*
General Cables (5/-)	30	30	14/6	—	10 6 10
Greenwood & Batley	15	15	37/-	—	8 2 2
Hackbridge Cable (5/-)	20	20	11/3	—	8 17 10
Hackbridge Hewittic (5/-)	18	20	16/3	—	6 3 0
Hall Tel. Acc.(10/-)	10	10	10/6	—	9 10 6
Heatrae (2/-) ..	12½	12½	4/-	—	6 5 0
Henleys (5/-) ..	20	20	17/9	+6d	5 12 8
Holophane (5/-) ..	15	20*	11/3	—	8 17 10
Hoover (5/-) ..	37½	35*	24/-	—	7 5 9

Company	Dividend Previous	Dividend Last	Middle Price 13th Oct. 1952	Week's Rise or Fall	Est. Yield £ s d
Equipment and Manufacturing (continued)					
Intl. Combustion (5/-)	20	25	24/-	+6d	5 4 3
Johnson & Phillips	15	15	53/3	—	5 12 9
Lancashire Dynamo	22½	12½*	42/6	—	5 17 8
Laurence, Scott (5/-)	12½	15	12/9	—	5 17 8
London Elec. Wire	10	12½	47/6	—	5 5 2
J. Lucas	17½	7½*	33/9	—	4 9 0
Marryat & S. (2/-)	22½	22½	5/-	—	9 0 0
Mather & Platt ..	12½	12½	42/6	—	5 17 8
Metal Industries ..	10	15	39/9	+1/16	—
Mid. Elec. Mfg. ..	15	15	55/9	—	5 11 6
Murex	12½	15	53/6	−6d	5 12 3
Newman Ind. (2/-)	6	10	2/3	—	8 17 10
Oldham & Son (1/-)	30	35	3/-	—	—
Parnall (Yate) (5/-)	6	6	4/-	−3d	7 10 0
Parsons, C. A. ..	15	10*	53/9	+1/16	—
Plessey (5/-) ..	20	22½	19/9	+1/-	5 14 0
Pye Deferred (5/-)	18	18	15/-	—	6 0 0
Revo (10/-) ..	27½	27½	40/-	+9d	6 17 6
Reyrolle	15	10*	47/6	—	—
Scot. Cable (4/-) ..	30	32	11/3	—	—
Siemens Ord. ..	10	10	33/-	—	6 1 3
Strand Elec. (5/-)..	17½	17½	8/9	—	10 0 0
Sturtevant (5/-) ..	16½†	17½*†	25/-	+1/16	—
Switchgear & Cowans (5/-)	22½	22½	11/3	+6d	7 17 9
Taylor T. (5/-) ..	20	20	20/-	—	5 0 0
T.C.C. (10/-) ..	20	20*	37/6	—	—
T.C. & M.	10	10	26/-	+6d	—
Telephone Mfg. (5/-)	10	10	8/-	+6d	—
Thorn Elec. (5/-) ..	10	12½	8/6	—	7 7 0
Tube Investments	25	25	55/9	+6d	—
Vactric (5/-) ..	Nil	Nil	3/9	—	Nil
Veritys (5/-) ..	Nil	7½	4/9	—	7 18 0
Walsall Conduits (4/-)	70	70	45/-	—	—
Ward & Goldstone (5/-)	45	45*	31/6	+1/8	—
Watford (2/-) ..	25	25	6/3	—	8 0 0
Westinghouse Brake	14	14	50/3	−6d	5 11 7
West, Allen (5/-) ..	12½	15	10/3	—	7 6 4
Trusts, Transport and Communications					
Anglo-Am. Tel.: A Ord.	4½	4½	85½	+1	5 5 3
Ord.	56/3	57/6	55	—	—
Anglo-Portuguese	8	8	20/6	—	7 16 1
Brit. Elec. Traction: Def. Ord. ..	22½	25	125	—	5 17 8
Cable & Wireless: Ord.	6	8	125½	+1	6 7 6
4% Loan ..	4	4	94½	−1	4 4 8
Calcutta Trams ..	6†	6†	22/6	—	5 6 8
Cape Elec. Trams	4	5	12/-	−6d	8 6 8
Marconi Marine ..	7½	10	30/6	—	6 11 2
Oriental Tel. Ord.	16	16	55/9	—	—
Telephone Props...	8	8	32/6	+½	4 18 6
Tele. Rentals (5/-)	10	10	8/9	+3d	5 14 3

* After capital bonus.
† Dividends are paid free of Income Tax.

NEXT WEEK'S EVENTS

Monday, 20th October

BIRMINGHAM.—Midlands Hotel. Birmingham Electric Club. "Operation Pluto," by A. C. Hartley.

CARDIFF.—S. Wales Institute of Engineers, Park Place, 6.0 p.m. I.E.E. Western Supply Group. Chairman's Address, by B. S. Gylee, followed by an address by C. M. Cock, chairman of the I.E.E. Supply Section.

CHESTER.—Incorporated Plant Engineers, Liverpool & North Wales Branch, 7.15 p.m. "Application and Control of Electrical Machines," by A. Fairhurst.

KINGSBURY.—Prince of Wales Hotel, 7.30 p.m. A.S.E.E. North West London Branch. "Electrical Equipment of Film Studios," by H. Clifton.

LIVERPOOL.—Royal Institute, Colquitt Street, 6.30 p.m. I.E.E. Mersey & North Wales Centre. "A Logical Approach to the Problems of Electric Space-Warming," by D. H. Parry.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. informal meeting. Discussion on "The Institution and Current Affairs," opened by the President.

NEWCASTLE-ON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio and Measurements Group. Chairman's Address, by D. R. Parsons.

NORWICH.—Royal Hotel, 7.30 p.m. I.E.E. District Meeting. "Technical Colleges and Education for the Electrical Industry," by Dr. H. L. Haslegrave.

Monday, 20th October-Wednesday, 29th October

LONDON.—New Horticultural Hall, Westminster. "Model Engineer" Exhibition.

Tuesday, 21st October

LEEDS.—1, Whitehall Road, 6.30 p.m. I.E.E. North Midland Utilization Group. "Domestic Electrical Installations: Some Safety Aspects," by H. W. Swann.

LIVERPOOL.—Lecture Theatre, Merseyside & N. Wales E.B., Whitechapel, 6 p.m. I.E.S. Liverpool Centre. Chairman's Address, by A. V. Milton.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Measurements Section. Chairman's Address, by Dr. L. Hartshorn.

2, Savoy Hill, W.C.2, 6.30 p.m. Association of Supervising Electrical Engineers. Presidential Address, by C. T. Melling.

MALVERN.—Winter Gardens Restaurant, 7.15 p.m. I.E.E. South Midland Centre. District meeting. "The Magnetic Fluid Clutch," by E. J. R. Hardy.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Supply Group. "Uses of Earthed Signal Conductors on Transmission Circuits," by W. Casson.

NOTTINGHAM.—Gas Showrooms, 6.30 p.m. I.E.E. East Midland Centre. "275 kV Developments on the British Grid System," by D. P. Sayers, Dr. J. S. Forrest and F. J. Lane.

ST. ALBANS.—Peahen Hotel, 7.30 p.m. Incorporated Plant Engineers, Herts Discussion Group. "Diesel Engine Maintenance."

STOKE-ON-TRENT.—M.E.B., 31, Kingsway, 6 p.m. I.E.S. Stoke-on-Trent Group. "Exterior Lighting for Coronation Year," by F. Jamieson.

Tuesday. 21st October-Friday, 24th October

LONDON.—Olympia. Annual Dairy Show.

Wednesday, 22nd October

BIRMINGHAM.—Imperial Hotel, 6.30 p.m. Institution of Heating and Ventilating Engineers, Birmingham & District Branch. "Engineering Equipment—The Royal Festival Hall," by R. J. Dickson.

Grand Hotel. Institute of Metal Finishing. Annual Autumn Meeting.

BRISTOL.—Grand Hotel, 7.15 p.m. Incorporated Plant Engineers, Western Branch. "The Application of the Gas Turbine to Industry," by A. W. Pope.

CHELMSFORD.—Public Library, 7 p.m. I.E.E. London Students' Section. District meeting. "Breakdown Stress of Air, at Low-, High- and Ultra-High Frequencies," by Dr. W. Jasinski.

COVENTRY.—Technical College, 7.15 p.m. A.S.E.E. Coventry Branch. "Recent Electric Furnace Development," by E. May.

HOVE.—S.E.E.B. Headquarters, 6.30 p.m. I.E.E. Southern Centre. "The Economics of Low-Voltage Electricity Supplies to New Housing Estates," by F. G. Copland.

LONDON.—I.E.E. London Students' Section. 2.30 p.m. Visit to Waterlow & Sons, Ltd., Wharf Road, City Road.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Radio Group. "What Practical Benefits can Communication Engineers expect from the Modern Information Theory?" by E. C. Cherry.

MIDDLESBROUGH.—Cleveland Scientific and Technical Institute, Corporation Road, 6.30 p.m. I.E.E. Tees-Side Sub-Centre. Students' Section. Chairman's Address, by J. C. Arkless.

PRESTON.—Preston & District Chamber of Commerce, 49a, Fishergate, 7.15 p.m. I.E.S. North Lancashire Group. Presidential Address, by W. J. Wellwood Ferguson.

Wednesday, 22nd October-Saturday, 1st November

LONDON.—Earls Court. 37th International Motor Exhibition.

Thursday, 23rd October

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Utilization Section. Chairman's Address, by Dr. J. W. T. Walsh.

MANCHESTER.—At the Engineers' Club, Albert Square, 7.30 p.m. The Institution of Engineering Inspection, North West Branch. "The Interpretation of Conventional Mechanical Test Results for Metals," by Dr. K. Entwistle.

SLOUGH.—Institute of Welding, North London Branch. "New Arc Welding Developments," by Dr. H. G. Taylor.

Friday, 24th October

EDINBURGH.—Institute of Welding, East Scotland Branch. "The Welding of Alloy Steels," by E. J. Mitchell.

LONDON.—Storey's Gate, St. James's Park, S.W.1. 5.30 p.m. Institution of Mechanical Engineers. "The Design and Operation of Dunston 'B' Generating Station with Particular Reference to 50 MW Turbo-alternators 'Unitized' with Reheater Boilers," by A. Howell and J. B. Jackson. (Joint meeting with the I.E.E.)

At the British Institute of Management, 8, Hill Street, W.1, 7 p.m. Institute of Materials Handling. "Handling: the New Technology," by L. Landon Goodman.

"Advice on Fireguards"

This is the title of a pamphlet produced under the auspices of the newly-formed Burning Accidents Committee, Birmingham. It illustrates and briefly describes five types of fireguards suitable for electric, gas and coal fires and is designed for public circulation. It is being supplied at 30s per thousand from the office of the Town Clerk, The Council House, Birmingham. We are informed that the Committee, in conjunction with the trade, has prepared a list of fireguards classified according to their safeness.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 3rd December from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1947

27558. C.R.V.T.C., Ltd., and Bolsam, M.—Electric cooking devices. 14th October, 1947. (683281.)

31046. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Cathode-ray tubes. 24th November, 1947. (683461.)

1948

23096. Centre National de la Recherche Scientifique, Chalin, C. E. J., and Epelboin, I.—Electrolytic treatment of metals. 1st September, 1948. (Cognate application 23097, 13th July, 1948.) (683462.)

1949

15139. Franco-British Electrical Co., Ltd.—Light-diffusing screens for use with illuminating means. 16th May, 1950. (Cognate applications 23642, 13th September, 1949. 23942, 16th September, 1949, and 26452, 14th October, 1949.) (683124.)

15869. Lister & Co., Ltd., R. A.—Automatic starting systems for engine driven electric alternating current generators. 14th June, 1950. (683125.)

16544. Stewarts & Lloyds, Ltd.—Protective coverings for metal pipes, cables, or the like. 25th April, 1950. (683207.)

20820. Radio Corporation of America.—Electron tubes. 10th August, 1949. (683471.)

24934. Compagnie Générale de Télégraphie sans Fil.—Electron optical systems for cathodes of electron beam tubes. 28th September, 1949. (683474.)

25800. English Electric Co., Ltd.—Electric transmission systems for vehicles. 6th October, 1950. (683396.)

26063. Research Corporation.—Electric-discharge tubes for accelerating particles. 11th October, 1949. (683475.)

27834. C.W.C. Equipment, Ltd.—Electric lighting fittings. 30th October, 1950. (683397.)

28225. Merlin Mouldings, Ltd., and Reeves, C. E.—Electric thermostats. 4th December, 1950. (683289.)

28983. Sylvania Electric Products, Inc.—Travelling-wave tube. 11th November, 1949. (683479.)

31665. Philips Electrical, Ltd.—Circuits for detecting photons or corpuscular particles. 9th December, 1949. (683214.)

33182. Electric & Musical Industries, Ltd.—Manufacture of directional viewing screens for television and other purposes. 22nd December, 1950. (683215.)

1950

45. Reyrolle & Co., Ltd., A., and Wild, R. W.—Resistance switching arrangements for electric circuit breakers. 22nd March, 1951. (683295.)

2982. Philips Electrical Industries, Ltd.—Voltage regulators. 6th February, 1950. (683407.)

3128. Honorary Council for Scientific & Industrial Research.—X-ray apparatus and methods of radiography. 7th February, 1950. (683408.)

4698. General Electric Co., Ltd., and Smith, R.—High-frequency electric induction heating apparatus. 23rd February, 1951. (683143.)

5120. Wild-Barfield Electric Furnaces, Ltd., Sims, C. W., and Ellis, C. C.—Electric resistance elements. 9th February, 1951. (683146.)

5596. British Thomson-Houston Co., Ltd.—Anchor-type escapements. 6th March, 1950. (683300.)

7001. Pye, Ltd.—Frame time bases, particularly for television receivers. 19th March, 1951. (683301.)

7795. General Electric Co., Ltd., Arbon, R. S., and Hunt, G. J.—Apparatus including thermionic valves for generating electrical signals. 28th March, 1951. (683302.)

9259. Collins, K.—Electric lamp shade carriers. 8th March, 1951. (683419.)

9266. Siemens & Halske Akt.-Ges.—Electric amplifiers comprising a semi-conductive element. 14th April, 1950. (683151.)

9413. Metropolitan-Vickers Electrical Co., Ltd.—Control equipment for electric motors. 5th January, 1951. (683152.)

9609. British Thomson-Houston Co., Ltd.—Phase shifting networks. 19th April, 1950. (Addition to 679672.) (683225.)

11403. British Insulated Callender's Cables, Ltd.—Enclosure for an electric cable joint. 7th May, 1951. (683308.)

11475/6. Charlesworth, P. A.—Electrolytic polishing of metals. 3rd August, 1951. (683309/0.)

11772. Philips Electrical Industries, Ltd.—Electron beam electric-discharge tubes wherein an electron current is formed into a beam. 11th May, 1950. (683491.)

12278. G.K.N. Group Services, Ltd.—Nuts for electrical welding to metal sheets and other metal parts. 17th May, 1951. (683228.)

15530. Marconi's Wireless Telegraph Co., Ltd.—Thermionic valve amplifiers. 28th February, 1951. (683319.)

15632. Telephone Manufacturing Co., Ltd.—Electromagnetic devices. 13th June, 1951. (683431.)

16180. Telefonaktiebolaget L. M. Ericsson.—Method for producing contact springs. 28th June, 1950. (683434.)

18660. General Electric Co., Ltd., and Dyott, R. B.—Electromagnetic waveguide systems. 9th July, 1951. (683497.)

19546. Siemens Bros. & Co., Ltd.—Coupling of electrical circuits. 27th July, 1951. (683324.)

19615. General Electric Co., Ltd., and Donaldson, D. H.—Testing of electrical apparatus. 13th September, 1951. (683240.)

21411. Alkaline Batteries, Ltd.—Charging arrangements for electric accumulators. 16th August, 1951. (683331.)

21463. Siemens & Halske Akt.-Ges.—Moving or attracted iron measuring instruments having band suspensions. 30th August, 1950. (683332.)

22123. Minister of Supply.—Waveguide devices. 3rd September, 1951. (683246.)

22826. Leverenz, W.—Process and apparatus for electrolytic regeneration of photographic fixing baths. 18th September, 1950. (683335.)

24474. General Electric Co., Ltd., Bradshaw, S. E., and Douglas, R. W.—Manufacture of crystal contact devices. 13th September, 1951. (683248.)

24477. General Electric Co., Ltd., and Jackson, E.—Piezo-electric crystal units. 13th September, 1951. (683249.)

24886. General Motors Corporation.—Electrical switch, particularly for direction indicator systems on vehicles. 12th October, 1950. (683338.)

25048. Automatic Electric Laboratories, Inc.—Three digit PBX connector. 13th October, 1950. (683339.)

26682. Igranic Electric Co., Ltd.—Electrical contacts. 1st November, 1950. (683343.)

27292. Westinghouse Electric International Co.—Dielectric heating. 8th November, 1950. (683172.)

28348. Metropolitan-Vickers Electrical Co., Ltd.—Protective spark gaps. 20th November, 1950. (683176.)

28531. Alfano, G.—Reels for electric cables. 22nd November, 1950. (683509.)

29249. British Thomson-Houston Co., Ltd.—Electric circuits. 29th November, 1950. (683345.)

30041. Soc. d'Electronique et d'Automatisme.—Electronic bi-stable trigger circuits. 7th December, 1950. (683180.)

30829. Sylvania Electric Products, Inc.—Guides for electrode mounts in lamp-sealing machines. 18th December, 1950. (683253.)

1951

317. Etablissements E. Jaeger.—Electrical switches controlled by fluid pressure. 4th January, 1951. (683351.)

389. Standard Telephones & Cables, Ltd.—Filter for transmission line. 5th January, 1951. (683352.)

955. Standard Telephones & Cables, Ltd.—Transmission line system for microwave signals. 12th January, 1951. (683353.)

3195. Standard Telephones & Cables, Ltd.—Supports for microwave transmission lines. 9th February, 1951. (683359.)

3684. Western Electric Co., Inc.—Magnetic recording and reproducing devices. 15th February, 1951. (683513.)

3921. General Motors Corporation.—Electric cables and processes of manufacture thereof. 19th February, 1951. (683361.)

4620. British Thomson-Houston Co., Ltd.—Regulating apparatus for dynamo-electric machines. 26th February, 1951. (683514.)

5093. Krupp Elektrowerkstätten, F.—Arrangement for charging storage batteries. 2nd March, 1951. (683187.)

6856. Hasler Akt.-Ges. Werke für Telephonie und Präzisionsmechanik.—Carrier-frequency installation for communication between mobile and stationary stations. 22nd March, 1951. (683265.)

8184. British Thomson-Houston Co., Ltd.—Tipping-off devices for tubular electric lamps. 9th April, 1951. (683191.)

9921. Igranic Electric Co., Ltd.—Electromagnetic timing relays. 27th April, 1951. (683365.)

10399. Standard Telephones & Cables, Ltd.—Engine indicators. 3rd May, 1951. (683367.)

10886. Standard Telephones & Cables, Ltd.—Electrical impedance units. 9th May, 1951. (Addition to 668752.) (683368.)

10887. Fairweather, W. C. (Singer Manufacturing Co.).—Snap switches suitable for electric lampholders. 9th May, 1951. (683196.)

12575. Philips Electrical Industries, Ltd.—Electrical impedance transformers for use at very high frequencies. 29th May, 1951. (683273.)

17781. Pitman, D. H.—Electromagnetic detector. 26th July, 1951. (683517.)

20860. British Thomson-Houston Co., Ltd.—Refrigerator breaker strip assemblies. 4th September, 1951. (683276.)

20938. Philips Electrical Industries, Ltd.—Cables for use in telephony. 5th September, 1951. (683374.)

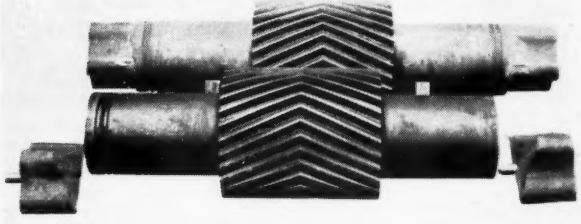
21166. Standard Telephones & Cables, Ltd.—Arrangement for measuring the power transmitted through an electromagnetic waveguide. 7th September, 1951. (683375.)

Reclaiming by Welding

AN interesting repair job was recently carried out by the Rumney Welding and Engineering Co., Ltd., for the Whitehead Iron and Steel Co., Ltd., Newport.

Two large wabblers, made of 55/60 nickel-chromium forged steel, were badly fractured in the shoulder adjoining the pinion, and it was decided that new wabbler ends should be forged and welded to the pinions. The existing wabblers were cut off and after the ends of the pinions had been trimmed up, a 1in clearance hole was drilled to a depth of about 2in in the ends of the pinion. Similar holes were drilled in the newly forged wabblers and a locating pin fitted through, joining the pinion and wabbler together and holding them in true alignment ready for welding. The area to be welded was then preheated to approximately 250 deg C and the repairs were made by using Armoid No. 1 electrodes. The illustration shows the fitting of the locating pin in preparation for welding and the smooth Armoid deposit on the welded wabbler.

The twin-arc process of the Quasi-Arc Co. is now being used successfully for the fabrication of heavy strong room doors and has enabled Chubb & Son's Lock & Safe Co., Ltd., Wolverhampton, to reduce one of their welding operations on a 4 ton door from 21 to 16½ hours. Nearly 20ft of butt welds are welded under severe restraint and the heavy deposits and well-filled craters which are a feature of the twin-arc method remove any danger of cracking.



Repairing a large wabbler by welding

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Dewsbury.—10th November. Town Council. Four centrifugal sewage and recirculating pumps, with motors, electrical work and equipment. Borough surveyor, Municipal Buildings.

Formosa.—TAIPEI.—3rd November. Central Trust of China. Hydro-electric equipment. (C.R.E. 32738/52. Ten/4878.)*

Haltwhistle (Northumberland). — 22nd October. R.D.C. Electrical installations in 12 houses. Surveyor, Council Offices.

Hornchurch.—24th October. Urban District Council. Illumination of pedestrian beacons. (See this issue.)

New Zealand.—WELLINGTON.—19th November. Posts and Telegraph Department. Supply of 6,500 carbon resistors. (C.R.E. 33530/52. Ten/4867.)* 21st November. Supply of 11,200 capacitors. (C.R.E. 33553/52. Ten/4870.)*

AUCKLAND.—10th November. Auckland Electric Power Board. Three 1,250 kVA transformers. (C.R.E. 33376/52. Ten/4883.)* 24th November. Two 12,000 kVA transformers. (C.R.E. 33681/52. Ten/4880.)* One 10,000 kVA transformer. (C.R.E. 33600/52. Ten/4886.)*

Pakistan.—KARACHI.—21st October. Director General, Supply and Development. Supply of 45 oil-immersed transformers. (C.R.E. 33644/52. Ten/4868.)*

Preston.—Education Committee. Electrical installation at Deepdale County Primary School. (See this issue.)

Romford. — 3rd November. Corporation. Electrical installations in 32 houses. (See this issue.)

Tottenham.—30th November. Town Council. Lamps for one year. Town clerk, Town Hall, N.15.

ORDERS PLACED

Alnwick (Northumberland). — R.D.C. Electrical work in connection with the erection of 100 miners' houses at Shilbottle.—J. R. Tweedy, Rothbury.

Burnley. — Manchester Regional Hospital Board. Recommended. Rewiring Bank Hall Maternity Hospital (£1,991).—Leeders Electrical Services, Ltd.

London.—L.C.C. Electrical installation at Monson Primary School, Deptford.—F. Lawrence.

Manchester.—Children's Committee. Electrical installations at "Ellerslie," Altrincham.—M. & W. A. Smithers.

Housing Committee. Recommended. Electrical installations in 36 flats, Peel Hall (Contract 160A.) and in 395 houses at Bowlee (Contract 165)—F. L. Bampton & Co., Ltd. Electrical installations in 96 houses, Chapel Lane, Blackley (Contract 158A.) and 103 houses, Chapel Lane, Blackley (Contract 158B.).—E. M. Evans & Son, Ltd.

Newcastle-under-Lyme. — Housing Committee. Accepted. Electrical installations in houses, Bradwell and Clayton estates (£3,582).—T. L. Whitley & Co., Ltd.

Nuneaton. — Corporation. Recommended. Renewal of electrical installation at Stockingford County School (£1,120).—Goldsmith & Cantrill.

Stoke-on-Trent. — Corporation. Recommended. Electrical installations in houses on various sites.—Newcastle Electric Co. (£10,661) and Midlands Electricity Board (£7,401).

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Addington.—Shops (15) and dwellings (13). Lodge Lane; Knight & Co., 3, Cromwell Place, S.W.7.

Factory, King Henry's Drive; British Metal Fabrications, Ltd., 11, Waterloo Place, S.W.1.

Barnsley.—Pithead baths at Darfield Colliery; A. Bradbury & Son, Ltd., builders, 334, Cemetery Road, Sheffield.

Bedlington (Northumberland). — Shops (16) and flats (8); A. K. Dennis, surveyor, U.D.C. Offices.

Bexhill-on-Sea.—Additions and alterations, Denbigh Hotel; Page & Overton, Ltd., 19, Surrey Street, Croydon.

Bilston.—Houses (36). Ward Street, Ettingshall; borough architect, 20, Wellington Road.

Birmingham.—Erection of Tile Cross Boys' Grammar School; Jackson & Edmonds, architects, 65, New Street. Bromford Girls' Grammar School; S. T. Walker, architect, 83, Suffolk Street.

Houses, Hawkesley Farm estate, West Heath (71) and Fairfax Road, West Heath (26); H. J. Manzoni, city engineer, Council House.

Brierley Hill.—Houses, Swan Lane, Kingswinsford (90), Market Street, Kingswinsford (75), Forge Lane, Wallheath (70), Harrison Road, Wordsley (50) and Lower Bromley, Pensnett (100); surveyor, Council Offices.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, Whitehall, S.W.1 (Trafalgar 8855).

Crayford.—Shops, maisonnettes, flats, stores, messroom and garages, Forest Road, Slade Green; U.D.C. surveyor, Town Hall.

Derby. — Secondary school, Humbleton (£145,499); Ford & Weston, builders, Osmaston Road, Derby.

Durham.—Grammar and technical school, Crossgate Moor (£240,000); Leslie & Co., East Mount Road, Darlington.

Elgin.—New town hall proposed in Moray Street (£110,000); burgh surveyor, South Street.

Farnham.—Dwellings (2,000) for L.C.C.; Holland & Hannen and Cubitts, Ltd., builders, 1, Queen Anne's Gate, S.W.1.

Frampton-on-Severn. — Grain silo for Ministry of Food; Howard Farrow, Ltd., builders, 1, Russell Parade, N.W.11.

Grantham.—Shops and flats at junction of Harrowby Lane and New Beacon Road (£22,053); W. Foster & Sons, Grantham.

Houses (50) on land between Belton Lane and Edinburgh Road; G. C. Munton, Ruskington, Lincs.

Grimsby.—Showrooms and offices, Osborne Street and George Street; Ford & Slater, Ltd., Gillcrest, Caistor.

Halesowen.—Houses (68), Hasbury Farm estate; A. T. Butler & Partners, architects, 31, Priory Street, Dudley.

Harlow.—Houses (1,000), Potter Street, for the Development Corporation; W. & C. French, builders, Epping New Road, Buckhurst Hill.

Hastings.—Secondary modern school for boys at St. Leonards; borough surveyor, Wellington Square.

Jarrow (Co. Durham).—Bus station, Station Street for the Northern General Transport Co., Ltd.; Fennell & Co., architects, Bridge End Chambers, Chester-le-Street.

Houses (60) at Simonside; borough engineer, Town Hall.

Lancaster.—Training unit for nurses and treatment centre at the Moor Hospital; T. Duffy, architect to Manchester Regional Hospital Board, Quay Street, Manchester.

Langley.—Dwellings (1,900) for L.C.C.; W. & C. French, Ltd., builders, 50, Epping New Road, Buckhurst Hill, Essex.

Leytonstone.—Extensions to factory for S. E. Porter & Sons, polishes, varnishes, etc., Argall Avenue, E.10.

London.—BATTERSEA.—Flats (30), St. James's Drive; borough engineer.

STEPNEY.—Five-storey blocks of flats, with shops, Bancroft Road; borough engineer, 227-233, Commercial Road, E.1.

Manchester.—R.C. secondary school, Wythenshawe; Reynolds & Scott, architects, 9, Albert Square.

New crematorium, Blackley; city architect

Middlesbrough.—New Berwick Hills No. 1 county primary school (£88,000); P. R. Middleton, education architect, Education Offices.

Mitcham.—Rebuilding Casualty Department of Wilson Hospital; South West Metropolitan Regional Hospital Board, 11, Portland Place, W.1.

Preston.—Operating theatres and physiotherapy department at Royal Infirmary; T. Duffy, architect to Manchester Regional Hospital Board.

Rhondda. — Houses (170), Craigwen, for U.D.C.; C. Gingell, architect, 15, Ystrad Road, Pentre.

Salford.—Primary school on site of Broughton High School; Cruikshank & Seward, architects, 16, Princess Street, Manchester.

Scunthorpe.—Houses, New Brumby estate (78) and bungalows for old people (14); borough architect.

Shipley.—Police sub-divisional headquarters (£25,000); West Riding county architect, Westfield Road, Wakefield.

Sunderland.—Abattoir for Ministry of Food (£160,000); Ministry of Works, Newcastle-on-Tyne.

Sutton Coldfield.—Houses (450), to be erected in 1953; T. Porter, borough surveyor, The Council House.

Swansea.—Showrooms and offices, Temple Street and Princess Way; David Evans & Co. (Swansea), Ltd., 37, St. Helens Road.

Teignmouth.—Reconstruction of Teignmouth Hospital; W. P. Wilkins & Sons, Ltd., builders, Brunswick Square, Torquay.

Tipton.—Flats (64); borough surveyor.

Tottenham.—Industrial development, White Hart Lane; Samuel South & Sons, Ltd., White Hart Potteries.

Tynemouth.—Houses (180); Leslie & Co., East Mount Road, Darlington.

Wallasey.—Proposed Birket Avenue Primary School; Ernest Griffiths & Sons, Kinders Allport Road, Bromborough, heating and electrical consultants.

Walsall.—Completion of second storey of old cleansing station (£15,000); borough engineer.

Warrington.—Erection of new high school for girls in 1953-54 programme (£160,000); borough engineer.

Wednesbury.—New St. Luke's church, Paul Street (£33,000); Lavender & Twentyman & Percy, architects, Waterloo Chambers, Waterloo Road, Wolverhampton.

Welwyn Garden City.—Houses (157) for Development Corporation; W. J. Simms, Sons & Cooke, Ltd., builders, 78, Mount Street, W.1.

West Hartlepool. — Bottling factory at Stranton for J. W. Cameron & Co., Ltd.; G. W. Lazenby, Ltd., builders, Ferryhill, Co. Durham.

Weybridge.—Factory (£160,000) for Vickers-Armstrong, Ltd.; Galbraith Bros., builders, Bartholomew Close, London, E.C.

Whickham (Durham). — Houses (94) at Swalwell for the U.D.C.; G.S.W. Urban Development Co., builders, The Side, Newcastle-on-Tyne.

Whitley Bay.—Houses and blocks of flats on Seatonville estate for U.D.C.; E. Roberts, surveyor, Council Offices.

Willenhall.—Houses (974) in the next three years; U.D.C. surveyor.

Wolverhampton.—Houses (40); Wm. Whittingham, Ltd., Powlett Street, Wolverhampton.